April 29, 2013

Ms. Brenda Edwards

US Department of Energy

Buildings Technologies Program

Mail Stop EE-2J

1000 Independence Ave, SW

Washington, DC 20585-0121

**Re: Energy Conservation Program: Notice of Proposed Rulemaking for Energy Conservation Standards for Residential Water Heaters, Docket Number: EERE–2012–BT–STD–0022, RIN Number: 1904–AC78**

Dear Ms. Edwards:

The **INSERT CO-OP NAME HERE** appreciates the opportunity to submit comments on the Department of Energy’s (“DOE” or “Department”) Notice of Proposed Rulemaking (“NOPR”) for Energy Conservation Standards for Residential Water Heaters.[[1]](#footnote-1)

**INSERT DESCRIPTION OF YOUR CO-OP HERE. SIZE, LOCATION, MISSION STATEMENT AS RELEVANT TO YOUR DEMAND RESPONSE PROGRAM, NUMBER OF WATER HEATERS IN PROGRAM, PLANS TO GROW PROGRAM IF ANY, AMOUNT OF ANNUAL SAVINGS TO MEMBERS FROM PROGRAM**

As DOE correctly recognized in the NOPR, DR and electric thermal storage (“ETS”) programs (together, “ETS programs”) that use electric storage water heaters (“ESWHs”) with tanks having a storage capacity greater than fifty-five gallons (“ large-volume ESWHs”) offer tremendous value to consumers and the electric grid.

**NAME OF CO-OP** is pleased that DOE recognized in the NOPR that action must be taken to mitigate the impacts of the April 2010 final water heater rule on utility ETS programs to help preserve the benefits of ETS programs. While we applaud DOE’s efforts to solve this issue, the waiver process described in the NOPR will not solve the problem as the annual duration of the waivers and the conditions the NOPR imposes on those waivers makes the NOPR simply unworkable. **If DOE does not make significant changes to the NOPR, we may lose the ability to use large ESWHs for our load management programs at great cost to our members.**

**NAME OF CO-OP** recommends that DOE avoid the practical challenges presented by the proposed waiver and instead adopt a separate appliance category for grid-enabled large-volume ESWHs. To the extent that DOE does not believe such a separate category can be created consistent with its legal authority, DOE should adopt a simple waiver for grid-enabled large-volume ESWHs. That waiver should be valid for at least five years – from 2015 to 2020 – and thereafter should be subject to modification or elimination with three years notice. Only a simple, long-term waiver can give the electric utility industry the certainty it needs to continue to invest in DR and ETS and the manufacturing community the certainty it needs to continue to produce the water heaters needed for those successful programs.

For decades, Congress, the Administration, and DOE have consistently expressed their support for DR and ETS. The separate appliance category or simple waiver for which **NAME OF CO-OP** is applying would demonstrate the Department’s continued commitment to those principles.

**YOU WILL NEED TO REGENERATE THE TABLE BELOW ONCE YOU HAVE COMPLETED YOUR EDITS. IF YOU’VE NOT ADDED ANY NEW TOPIC HEADINGS, YOU CAN RIGHT\_CLICK OVER THE TABLE AND THEN CLICK ON “UPDATE TABLE.”**

Contents

[1. DOE Should Adopt A Separate Classification for Grid-Enabled Large-Volume ESWHs 4](#_Toc352932991)

[2. In the Alternative, DOE Should Adopt a Simple Waiver for Grid-Enabled Large-Volume Electric Resistance Water Heaters That Promotes DR Programs 4](#_Toc352932992)

[3. Consistent Federal Policy Makes Clear the Need for a Separate Classification or Simple Waiver 6](#_Toc352932993)

[4. Utility ETS Programs Using Electric Water Heaters Provide Enormous Value to Consumers, the Grid, and the Nation 10](#_Toc352932994)

[a. Utility ETS Programs Using Electric Water Heaters Have Reached a High Penetration Level and Are Growing 10](#_Toc352932995)

[b. Utility ETS Programs Using Water Heaters Offer Significant Economic Benefits to Consumers 12](#_Toc352932996)

[i. Utility ETS Programs Using Electric Water Heaters Provide Peak Shaving Benefits 12](#_Toc352932997)

[ii. Utility ETS Programs Using Electric Water Heaters Enable Increased Integration of Wind Generation 13](#_Toc352932998)

[iii. Utility ETS Programs Using Electric Water Heaters Provide Critical Ancillary Services 15](#_Toc352932999)

[5. The NOPR, While Well-Meaning, Will Not Preserve Much Less Promote Utility ETS Programs Using Electric Water Heaters 17](#_Toc352933000)

[a. DOE Should Drop Its Proposed One-Year Waiver Because The Short Term Denies Utilities and Manufacturers The Certainty They Need 17](#_Toc352933001)

[b. DOE Should Drop Its Proposed Restrictions On Waivers Because They Do Not Reflect Realistic Market Conditions 19](#_Toc352933002)

[ii. There Are No Universal Load Control Or Grid-Interaction Devices On The Market Today 20](#_Toc352933003)

[iii. DOE Should Not Impose A Limitation On The Number Of Units Provided Waivers 21](#_Toc352933004)

[6. There Are Far Simpler Approaches to Limit “Leakage” That Support DR Than Those Proposed In The NOPR Or At The Public Meeting 21](#_Toc352933005)

[7. Heat Pump Water Heaters do Not Perform The Same Function as Large-Capacity Electric Resistance Water Heaters 23](#_Toc352933006)

[i. Elevated Temperature Water Storage 24](#_Toc352933007)

[ii. Compressor Cycling 24](#_Toc352933008)

[iii. Space, Noise, and Cold Climate Issues 25](#_Toc352933009)

[b. No Additional Analysis Is Required Before Issuing a Waiver 25](#_Toc352933010)

# DOE Should Adopt A Separate Classification for Grid-Enabled Large-Volume ESWHs

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.[[2]](#footnote-2) Moreover, the NOPR concluded that action by the Department is required to[[3]](#footnote-3) mitigate the adverse impacts that the April 2010 final rule efficiency standards would have on those DR programs.[[4]](#footnote-4)

Grid-enabled large-volume ESWHs, which are capable of being used in a DR program “have a capacity or other performance-related feature which other products within such type (or class) do not have and such feature justifies a . . . lower standard from that which applies (or will apply) to other products within such type (or class).”[[5]](#footnote-5) For that reason, that the Secretary of Energy (“Secretary”) should establish grid-enabled large-volume ESWHs as a separate class from other large-volume ESWHs with a lower required efficiency factor than those imposed in the 2010 standard.

Such an action would not be prohibited by the anti-backsliding provisions of the Act, which applies to amended standards.[[6]](#footnote-6) This is not a request for an “amended” standard for a product. Rather, we are requesting a new classification. Such a request was plainly anticipated by Subsection 6295(q), which grants the Secretary clear authority to establish a level of energy use or efficiency that is “higher or lower” than that which “applies (or will apply) to other products within such type (or class).”[[7]](#footnote-7) Thus, the Secretary can establish a lower level of efficiency or higher level of energy use for products whether or not there is an existing standard that now applies to other similar products.

# In the Alternative, DOE Should Adopt a Simple Waiver for Grid-Enabled Large-Volume Electric Resistance Water Heaters That Promotes DR Programs

If DOE concludes that it lacks the legal authority to adopt a separate classification for grid-enabled large-capacity electric resistance water heaters, it should adopt a simple waiver for such water heaters that makes it easy for manufacturers to produce the water heaters required for DR programs, makes it easy for consumers to acquire them, and makes it easy for utilities to operate and expand their programs. Now that DOE has concluded that the DR programs provide significant value to consumers – in the range of tens of millions of dollars per year – it would be irrational to adopt a waiver program that discourages manufacturers from producing the necessary water heaters, consumers from buying them, or utilities from building their programs.

For that reason, we recommend that DOE provide manufacturers a waiver from the 2010 efficiency standards for those large-capacity electric resistance water heaters that are capable of being used in a DR program. The waiver should be good for at least the first five years, from 2015 until 2020. The waiver should be evergreen after that, continuing until DOE concludes that the waiver is no longer serving its purpose and should be modified or eliminated. Such modification or elimination should not take effect until three years after the determination.

The longer term of the waiver, the evergreen provisions, and the three-year notice provision are required to provide manufacturers, utilities, and consumers a level of certainty. Manufacturers need to have certainty that they will be permitted to produce their product to justify the business decision to continue to invest in their product lines and their production facilities, hire and train employees, line up sources for raw materials, etc.

Utilities need certainty that they will be permitted to continue to operate and expand their DR programs to justify the business decision to continue to invest in promoting their DR program to their consumers, continuing to invest in their communications and control devices, continue to train and hire employees to operate their program, and perhaps most importantly, continue to rely on DR programs as a resource rather than investing in other long-lived assets such as generation, transmission, or distribution facilities for which the DR program can substitute. Consumers need certainty that the water heaters they purchase will continue to be supported by the manufacturers.

**INSERT HERE THE REASONS WHY YOU THINK A ONE-YEAR WAIVER WOULDN’T WORK FOR YOU AND YOUR DEMAND RESPONSE PROGRAM.**

**INCLUDE THIS PARAGRAPH IF IN AN RTO MARKET**A minimum three year period of certainty is also critical in certain organized markets, such as PJM. Demand response programs, including those utilizing control of water heaters, may be bid into the PJM capacity markets. To qualify, the bidder must be able to assure PJM that the resource will be available three years out from the auction year.

Congress demonstrated its understanding of the need for significant notice in 42 U.S.C. § 6295(m)(4)(A)(ii), which requires five years of notice before amended standards can apply to water heaters, 2 years longer than the transition period required for many other covered products.[[8]](#footnote-8)

The waiver should not be subject to artificial limitations or restrictions, such as a limit on the number of water heaters that can qualify, the distribution chains through which they can be distributed, or the control devices that can be used to operate them. Such limitations serve only to discourage the manufacturers and the utilities from the investments, competition, and creativity required to stimulate investments in and improvements in smart grid and DR. The waiver should be designed in a manner that promotes innovation and investment, or at the very least, does not interfere with it.

If DOE concludes that the products that qualify for the waiver must be physically differentiable from most existing water heaters on the market today to qualify as “grid-enabled,” there are a number of different options: control devices; interfaces; and modified wiring schematics that provide utilities easier access to control the water heaters. As discussed below, however, none of them are universally useful to utilities. Any controllers, interfaces, or other technologies integrated with the water heaters must be bypassable to leave utilities the ability to use the controllers or interfaces that are consistent with their systems. Given the heavy emphasis today on ensuring “interoperability,” it would be highly contradictory for DOE to require water heaters to be manufactured in a manner that made them non-interoperable with utility DR systems.

**INSERT HERE EXPLANATION WHY A ONE-SIZE-FITS-ALL CONTROLLER OR INTERFACE AFFIXED TO THE WATER HEATER WOULDN’T WORK FOR YOU AND YOUR DEMAND RESPONSE PROGRAM**

We understand that DOE is concerned about leakage – water heaters produced pursuant to the waiver used simply to provide hot water. We consider it unlikely that there will be much leakage. However, if necessary, we could support the imposition of simple post hoc reporting requirements on the industry, so that DOE can monitor how many water heaters are produced pursuant to the waiver and how many water heaters are being integrated into utility DR programs. While any such reporting is likely to be imperfect, it should give DOE a sense of the number of water heaters in the market that may not be purchased for use in DR programs. If that number is too high, then DOE could take action in 2017 or 2018 to modify or terminate the waiver program effective 2020 or 2021. That would limit the degree to which the waiver could lead to extensive leakage, without denying manufacturers, utilities, or consumers the degree of certainty required to support the utility DR programs.

# Consistent Federal Policy Makes Clear the Need for a Separate Classification or Simple Waiver

As early as 1978, in the Public Utility Regulatory Policies Act (“PURPA”), Congress established as Federal Policy that “[e]ach electric utility shall offer to its electric consumers such load management techniques as the State regulatory authority (or the nonregulated electric utility) has determined will – (A) be practicable and cost effective . . . (B) be reliable, and (C) provide useful energy or capacity management advantages to the electric utility.”[[9]](#footnote-9)

Congress reaffirmed that policy in 2005, in the Energy Policy Act (“EPAct”). In Section 1252(d), Congress directed the Secretary to work with states, utilities, other energy providers and advanced metering and communications experts to identify and address barriers to the adoption of DR programs and directed the Secretary to provide Congress with a report that identifies and quantifies the national benefits of DR and makes a recommendation on achieving specific levels of such benefit.[[10]](#footnote-10) Congress further announced that “[i]t is the policy of the United States to encourage States to coordinate, on a regional basis, State energy policies provide reliable and affordable demand response services to the public” and directed the Secretary to provide technical assistance to the states in that effort.[[11]](#footnote-11) Congress went on to announce that “[i]t is the policy of the United States that time-based pricing and other forms of DR . . . shall be encouraged, the deployment of such technology and devices that enable electricity customers to participate in such pricing and DR systems shall be facilitated, and unnecessary barriers to DR participation in energy, capacity, and ancillary service markets shall be eliminated. It is further the policy of the United States that the benefits of such DR that accrue to those not deploying such technology and devices, but who are part of the same regional electricity entity, shall be recognized.”[[12]](#footnote-12)

In response to Section 1252, DOE submitted to Congress a report titled *Benefits of Demand Response in Electricity Markets and Recommendations for Achieving Them*.[[13]](#footnote-13) In that report, the Secretary enumerated many of the benefits of DR, including participant financial benefits, market-wide financial benefits, reliability benefits, and market performance benefits. The Secretary then recommended that DOE encourage DR nationwide through approaches that included improving incentive-based DR, strengthening DR analysis and valuation, integrating DR into resource planning, adopting enabling technologies, and enhancing Federal DR actions.[[14]](#footnote-14) That report expressly noted that traditional load management programs, including direct load control of residential water heaters, have “an established track record of providing cost-effective DR [and] should be maintained or expanded.”[[15]](#footnote-15)

Congress expressed its support for DR yet again in the Energy Independence and Security Act of 2007 (“EISA”). In Section 1301, Congress stated:

[i]t is the policy of the United States to support the modernization of the Nation’s electricity transmission and distribution system to maintain a reliable and secure electricity infrastructure that can meet future demand growth and to achieve each of the following, which together characterize a Smart Grid: . . . (4) Development and incorporation of DR, demand-side resources, and energy-efficiency resources . . . (6) Integration of “smart” appliances and consumer devices . . . (7) Deployment and integration of advanced electricity storage and peak-shaving technologies. . . [and] (10) Identification and lowering of unreasonable or unnecessary barriers to adoption of smart grid technologies, practices, and services.[[16]](#footnote-16)

In Section 529 of EISA, Congress went beyond announcing the policy of the United States and directed the Federal Energy Regulatory Commission (“FERC”) to conduct a national assessment of DR potential; to develop a National Action Plan on Demand Response (“Action Plan”) to promote DR within the States and with consumers; and then with the Secretary, to submit to Congress a proposal to implement the Action Plan.[[17]](#footnote-17) Both FERC and the Secretary responded to Congress with an Action Plan and Implementation Proposal (“Implementation Proposal”). In the Implementation Proposal, DOE explained the significant support it has provided to DR in recent years. This included support to DR through grants under the American Recovery and Reinvestment Act;[[18]](#footnote-18) facilitation of conversations about DR between state commissioners and others through the New England DR Initiative, the Mid-Atlantic Distributed Resources Initiative, the Midwest DR Initiative, and the Pacific Northwest DR Initiative; through education and information sessions for regulators and state officials through grants to the National Association of Regulatory Utility Commissioners (“NARUC”), the National Conference of State Legislatures, the National Governors Association, the National Association of State Energy Officials, and the Western Governors’ Association; and funding for technical assistance on DR and smart grid issues to approximately individual 30 states.[[19]](#footnote-19) The Implementation Plan also expresses DOE’s intention to continue to provide assistance on DR, through direct technical assistance to state commissions, funding for technical papers on DR programs and technologies, and many other avenues.[[20]](#footnote-20)

In response to Congress and its own understanding of the value of DR, FERC has also made a significant commitment to promoting DR. As noted in the Implementation Proposal, FERC has sponsored the thrice-yearly FERC-NARUC DR Collaborative and Smart Response Collaborative.[[21]](#footnote-21) FERC has also issued several significant orders requiring DR to be incorporated into its jurisdictional wholesale markets and establishing the rates for which DR should be paid in those markets.[[22]](#footnote-22)

The White House has also weighed in on this issue. In 2011, the National Science and Technology Council of the Executive Office of the President issued *A Policy Framework for the 21st Century Grid: Enabling Our Secure Energy Future* (“Policy Framework”). In that Policy Framework, the Administration stated that “Federal, state, and local officials should strive to reduce the generation costs associated with providing power to consumers or wholesale providers during periods of peak demand and encourage participation in demand management programs.[[23]](#footnote-23) The Policy Framework explains that:

Demand response has the potential to reduce costs for all ratepayers – not just the participants in a particular demand response program. Notably, tapping demand response resources to reduce the hours that expensive peaking plants operate promises to reduce generation costs to serve peak load. In some circumstances, demand response programs also allow utilities to defer construction of additional electricity generation, transmission, or delivery resources. Savings from these activities can be provided back to ratepayers. Recognizing its tremendous potential to reduce costs and increase reliability, FERC Chairman Jon Wellinghoff has called DR the “killer app” for smart grid technology.[[24]](#footnote-24)

The Policy Framework specifically promotes traditional direct load control in addition to cutting edge technologies[[25]](#footnote-25) and calls out cooperatives in particular for having “significant penetrations of DR initiatives and load control programs aimed at reducing their exposure to price volatility during peak times.”[[26]](#footnote-26)

In light of this history, Congress’ policy directives, the Secretary’s own acknowledgement of the importance of DR including direct load control of water heaters, and the Department’s recent statements in the 2012 Request for Information (“RFI”), we can only assume that had DOE staff and the Secretary understood the full, practical implications of the 2010 standard for DR at the time it was drafted, that standard would have looked different. Unfortunately, DOE staff and the Secretary did not have that information it garnered from the RFI at the time it drafted the 2010 standard.

Had DOE had that information, we presume DOE would have adopted a different efficiency factor for large capacity water heaters or would have established a different classification pursuant to 42 U.S.C. § 6295(o)(2)(A) for large capacity electric water heaters capable of being used in DR programs. Given DOE’s long history of support for DR programs and the clear direction from Congress, DOE would not have knowingly adopted an efficiency standard that undermined DR programs, states and utilities established in response to PURPA, EPAct, and EISA to bring consumers and the grid the extensive benefits that the Secretary described in his 2006 Benefits Report to Congress and acknowledged in the NOPR.

It seems only reasonable, therefore, that the Secretary should use the discretionary authority granted him by Section 6295(o)(2)(A) to establish a separate category now for large capacity electric water heaters capable of being used in DR programs or the discretionary authority granted him by Section 7194(a) to provide manufacturers of those water heaters a simple and workable waiver from the 2010 efficiency standard.

# Utility ETS Programs Using Electric Water Heaters Provide Enormous Value to Consumers, the Grid, and the Nation

DOE explains in its NOPR that of the 127 comments it received in response to its Request for Information, 120 recommended that DOE take action to protect utility ETS programs from potential harm caused by the April 2010 standard, while only two opposed such action.[[27]](#footnote-27) The commenters offered substantial evidence of the large benefits that utility ETS programs offer to consumers and the grid, including: peak load reductions of approximately 145 MW; an annual cost savings to utilities of approximately $60 million; cost savings to consumers through discounted energy rates and financial incentives; consumer education; energy conservation; reductions in the need for new infrastructure investments; improved reliability; improved utilization of the generation and transmission system; and increased ability to integrate renewable resources into the system.

On the basis of that evidence, DOE was quite justified in concluding “that the evidence presented indicates that these programs provide a number of valuable benefits to consumers, utilities and the Nation.”[[28]](#footnote-28) In fact, however, the specific peak load reductions and cost savings to utilities and consumers from utility ETS programs far exceed the figures cited by the NOPR.

## Utility ETS Programs Using Electric Water Heaters Have Reached a High Penetration Level and Are Growing

According to the 2012 FERC report *Assessment of Demand Response and Advanced Metering*, potential peak reduction associated with residential customers grew by thirteen percent, from 7,189 MWs in 2010 to 8,134 MWs in 2012. Of this, 6,940 MWs are attributable to direct load control programs. Approximately 5.8 million customers were enrolled in direct load control programs across the nation, including every North American Electric Reliability Corporation region. The report also found that the potential DR resource contribution from all U.S. DR programs is estimated to be nearly 72,000 MW, or about 9.2 percent of U.S. peak demand.[[29]](#footnote-29) A data set of DR survey results accompanying the FERC report further indicates that electric resistance water heater programs are an integral part of the national DR strategy. Water heater programs were identified in thirty-five of fifty states and were conducted by investor-owned utilities, cooperatively owned utilities, and municipally owned utilities.[[30]](#footnote-30) As the FERC report did not specifically quantify the concentration of water heater programs within the category of “direct load control” programs, the electric utilities have undertaken their own surveys to supplement the FERC report findings on the overwhelming penetration of direct load control programs throughout the country.

To provide more detailed information while still ensuring a national sample, our national trade association, NRECA issued a DR survey in early 2012 to its members. The NRECA survey revealed that thirty percent of respondents currently offer their customers a water heater direct load control program as part of their overall direct load control program. Another ten percent are actively considering implementing a water heater program. Furthermore, cooperatives with direct load control programs are experiencing, on average, a four percent annual participation growth rate in large-volume electric water heaters used in their programs, indicating that such water heaters are expected to continue to be a significant part of their ongoing direct load control programs. The survey also provided water heater load control capacity amounts from 109 cooperative survey respondents. The estimated peak load reduction capability from water heaters for those utility systems is more than 500 MWs during both summer and winter months. For many systems, large-volume water heaters comprise a significant portion of the controlled units.

**INSERT HERE AGAIN DETAILS ABOUT HOW LARGE YOUR CONTROL PROGRAM IS, HOW MANY KWs YOU CAN CONTROL, PERCENTAGE OF PEAK LOAD YOU CAN SHIFT DURING WHICH SEASONS, RATE AT WHICH YOUR PROGRAM IS GROWING OR YOU EXPECT IT TO GROW.**

An American Public Power Association (“APPA”) survey of its membership across 49 states discovered that 44.5% of respondents currently offer their customers a water heater direct load control program as part of their overall direct load control program. Based on this survey it was also found that the average water heater load control program had a summer reduction of 4.9% of load while in winter the average reduction was 4.4% of load.

The Edison Electric Institute (“EEI”) reviewed member company websites and found that at least 14 investor-owned utility companies operating in at least twelve states operate DR programs for residential electric resistance water heaters. It is likely that with the increase in households with “smart meters” over the next several years as a result of the “smart grid,” the number of utilities that offer such programs for “smart” water heaters will increase.[[31]](#footnote-31)

While these surveys do not permit an exact quantification of the peak megawatt (“MW”) of water heater load that utilities can control, it is clear that the number is at least five times the 145 MWs cited by DOE, and that the consumer savings probably exceed the $60 million in annual savings estimated by DOE by at least the same multiplier. That suggests that current utility load control systems are saving consumers over $300 million per year today, and will save consumers considerably more in the future as those programs grow.

## Utility ETS Programs Using Water Heaters Offer Significant Economic Benefits to Consumers

The direct and indirect economic benefits to consumers from the use of grid-interactive large-volume ESWHs can be segmented into at least three distinct areas. All three rely on consumers’ ready access to affordable large-capacity electric-resistance water heaters that can simultaneously meet their needs for hot water and utilities’ operational requirements.

### Utility ETS Programs Using Electric Water Heaters Provide Peak Shaving Benefits

Electric water heater direct load control programs aimed at peak shaving provide significant benefits to individual consumers as well as the greater community dependent on reliable, low-cost supply of electricity. **EXPLAIN HOW MUCH EACH PARTICIPATING CONSUMER RECEIVES IN INCENTIVES EACH YEAR AND HOW MUCH EACH CONSUMER ON YOUR SYSTEM SAVES IN REDUCED POWER COSTS AS A RESULT OF YOUR PEAK SHAVING EFFORTS. WHAT SAVINGS DO YOU GET FROM REDUCED ENERGY COSTS, REDUCED DEMAND COSTS, REDUCED INVESTMENTS IN NEW PEAKING RESOURCES, ETC?**

### Utility ETS Programs Using Electric Water Heaters Enable Increased Integration of Wind Generation

**IF YOU ARE IN A REGION WITH SIGNIFICANT WIND RESOURCES, YOU MAY WANT TO INCLUDE PORTIONS OR ALL OF THIS SECTION. IF YOU CAN ADD CO-OP OR REGION SPECIFIC DATA ON THE WIND-INTEGRATION BENEFITS OF DEMAND RESPONSE, PLEASE DO.**Grid-interactive electric water heaters are available to serve as energy storage devices providing a market for consumption of wind generation in off-peak hours, which can then be made available to customers upon demand in the form of stored hot water during on-peak hours. In these programs, utilities provide incentives to customers to install water heaters with a grid-interactive device that provides the communication and control to ensure that they heat water only during off-peak periods. Since low-cost wind energy generation is typically available at night (sometimes in excess and at negative prices) this strategy is ideal for lowering the overall energy costs of a utility, thereby applying downward pressure on electric rates for the consumer. Moreover, this strategy can assure customers who “buy green” electricity that they are taking affirmative steps to shift their consumption to enable the use and development of such renewable resources. It also significantly reduces the number, duration, and extent of curtailment periods when the output of wind generators must be reduced to preserve reliability on the system during high-wind/low-load periods. The numbers of such hours have been increasing significantly in the United States as wind-penetration levels increase, and the expansion of ETS programs offers a constructive response.

With the advent of hourly energy markets and the accessibility to real-time market price information in nearly every region of the United States, advanced storage strategies based on wholesale Locational Marginal Price (“LMP”) have been implemented. When utilities control the water heater so that it is allowed to charge only when the LMP is low, the water heater will operate at a lower cost than if the unit is operated without regard to the time of day or price signals. Through grid-interaction, a decision can be made by the utility to charge the unit if the price falls below certain levels and prohibit the charging of the unit if the price exceeds certain levels. A large-volume ERWH with integrated controls effectively enables this strategy. With sufficient storage capacity and fast enough heating capability, the charge level can be determined such that it avoids the problem of running out of hot water as a result of the control strategy and does not inconvenience the consumer.

For example, Electric Power Research Institute (“EPRI”) recently compared wholesale energy cost savings and ancillary services revenue of a large-volume ERWH controlled based on LMP, controlled for the ancillary service “Regulation”, versus an uncontrolled unit. Lab results in the table below indicate significant cost savings from advanced water heater control strategies over non-controlled devices.[[32]](#footnote-32) EPRI found that operating a large-volume water heater based on wholesale price information yielded a 21.5% energy cost savings when compared to the same uncontrolled water heater. When a water heater was controlled based on price information and to provide frequency regulation services, the water heater cost fifty-five percent less to operate than the uncontrolled unit.



As increasing amounts of intermittent renewable energy generation have come online (primarily wind and solar), the need for renewable storage becomes more and more prominent. According to the American Wind Energy Association, the U.S. wind energy industry had its strongest year ever in 2012, installing a record 13,124 MWs. A record-breaking 8,380 MWs were installed during the fourth quarter alone. During 2012, utility-scale turbines were installed in 26 states and Puerto Rico. There are now 60,007 MWs across 39 states plus Puerto Rico.[[33]](#footnote-33) According to the Solar Energy Industry Alliance, photovoltaic (“PV”) installations grew seventy-six percent over 2011, to total 3,313 MWs in 2012, with an estimated market value of $11.5 billion. Each market segment (residential, non-residential, and utility) showed growth over 2011, while the overall markets in most states expanded as well. Installed prices for PV systems fell twenty-seven percent during 2012 and at least thirteen percent in each market segment. Nearly 83,000 homes installed solar PV, and cumulative PV installations in the United States surpassed 300,000.[[34]](#footnote-34)

By necessity, the electric utility industry is experimenting with MW-scale battery and flywheel technologies that promise performance and flexibility, while carrying the added burdens of cost and complexity. The nation needs an “all of the above” storage technology development strategy and ETS is the “low hanging fruit.” Operating as a “thermal battery,” it is the only cost-effective, widely deployable distributed storage option currently available. In addition, providing excess, low-cost or no-cost renewable energy to an electric water heater as part of a ETS strategy can significantly reduce the carbon footprint of the appliance.

### Utility ETS Programs Using Electric Water Heaters Provide Critical Ancillary Services

A third control strategy being piloted in select areas around the country involves the utilization of large-volume electric resistance storage water heaters as a tool for regulating frequency and otherwise ensuring the reliability of the grid through cycling of the water heater in response to short-term grid signals. This effective use of water heaters is being demonstrated in PJM and in other markets.

The quick response features of being able to cycle certain appliances such as electric water heaters without adversely impacting the customer’s hot water needs is being seen as increasingly critical to cost-effectively maintaining grid reliability while at the same time accommodating renewable integration and reducing dependence on fossil fuels. It is widely accepted that the need for short-term balancing resources (second-by-second or minute-by minute) increases with wind energy penetration levels.[[35]](#footnote-35) New technologies (flywheels and advanced batteries) and new control strategies for common technologies (water heaters, pumps, motors) have proven capable, and in some cases superior, in providing this fast-response balancing service when compared to most traditional generation. The FERC recently recognized the value of these fast-response devices in its Order 755, which mandates ISOs and RTOs to implement a “pay-for-performance” mechanism in their frequency regulation markets. In Order 755, FERC stated: “the use of faster-ramping resources for frequency regulation has the potential to improve operational and economic efficiency and, in turn, lower costs to consumers in the organized markets.”[[36]](#footnote-36) This FERC mandate creates a new market opportunity for fast-response, highly controllable loads such as electric resistance water heaters.

Two of the nation’s largest electric grid operators, PJM and Bonneville Power Administration (“BPA”), are actively involved in testing the ability of grid-interactive water heaters to provide frequency regulation and controllable ramping ability during periods of excess renewable energy generation, respectively.[[37]](#footnote-37) In the case of PJM, nearly two years of operational experience using a water heater located in their office building to “charge” during periods of low-cost wholesale power while simultaneously providing frequency regulation in response to a four-second control signal has yielded extremely positive results. The water heater has been able to choose to heat water during the hours of lowest wholesale prices based on the day-ahead schedule. As a result it is able to respond as fast and as accurately, if not more so, than many other advanced storage technologies coming to market today, all while providing continuous hot water to the customer with no interruption.

As part of a series of smart grid demonstration pilots, BPA and five partner utilities across the Pacific Northwest have deployed hundreds of grid-interactive water heaters in residences (some new, some retrofitted with controls) to test the aggregated bulk energy storage and balancing capabilities of large-volume devices. Today, BPA faces difficult wind integration scenarios in which they need resources to store energy quickly in response to wind energy ramping events, or face having to curtail wind generators or take other emergency operating procedures. Wind generation in BPA has been installed at a rapid pace and the balancing authority can now foresee a future where the current installed wind capacity of 4,750 MW increases to a level close to its peak load, making flexible operating conditions and resources that much more important. These pilots are running for two years and were started in September 2010.[[38]](#footnote-38) The data, results, benefits, and next steps that result from these pilots will continue to inform the industry of the value proposition of these advanced grid-interactive features of large-volume water heaters.

**IF YOU HAVE ANYTHING SPECIFIC TO ADD WITH REGARD TO THE ANCILLARY SERVICE BENEFITS OF DR, PLEASE DO.**

**IF YOU HAVE EVIDENCE OF SPECIFIC BENEFITS FROM YOUR DEMAND RESPONSE PROGRAM THAT DO NOT FALL WITHIN ONE OF THE THREE SECTIONS WE’VE INCLUDED, THIS IS THE PLACE TO DISCUSS THEM. IF YOU GET OPERATIONAL OR RELIABILITY BENEFITS, FOR EXAMPLE, PLEASE ENUMERATE THOSE HERE.**

# The NOPR, While Well-Meaning, Will Not Preserve Much Less Promote Utility ETS Programs Using Electric Water Heaters

In light of the consistent statements in support of DR made by Congress, DOE, FERC, and the White House, we would argue that DOE has an obligation to do what it can to promote ETS programs using electric water heaters. Unfortunately, the NOPR would serve the opposite purpose. The short tenure of the proposed waiver and the significant limitations proposed to be placed on that waiver would do nothing to protect utility ETS programs using electric water heaters from the harmful impacts of the 2010 efficiency standard.

# DOE Should Extend Its Proposed One-Year Waiver Because The Short Term Denies Utilities and Manufacturers The Certainty They Need

The NOPR would permit utilities and/or manufacturers to request waivers from the 2010 efficiency standard for one year at a time. The proposed process would require the applicant or applicants to send a letter each review period (annually) to the Assistant Secretary of Energy (“Assistant Secretary”) and await a decision following an undefined review process. It is not clear how long it would take to obtain a waiver or how far in advance of each new year a waiver would be granted. At least one participant in the public hearing on the NOPR on March 15, 2013 (“Public Hearing”) argued that waiver applications should be subject to notice and comment.[[39]](#footnote-39) That suggests that each waiver decision could be subject to a contested proceeding or even litigation each and every year.

**CUSTOMIZE THIS PARAGRAPH TO REFLECT YOUR OWN CONCERNS ABOUT THE IMPACT OF A ONE-YEAR WAIVER ON YOUR PROGRAM.** The one-year waiver proposed in the NOPR simply does not give utilities the certainty they need to maintain their ETS programs. Development and implementation of ETS programs is a complex, multi-year process that requires cooperation among many stakeholders, including staff, contractors, regulators and/or board of directors, and their consumer-members. It also requires a substantial investment in time, technology, communications infrastructure, staff, and advertising to maintain a program. Moreover, utilities compare potential investments in DR to potential investments in competing long-lived generation and transmission assets. If cooperatives do not know year-to-year whether the water heaters they need for their programs will continue to be available, they cannot justify a continued investment in the programs. Witness after witness at the Public Hearing consistently made this point.[[40]](#footnote-40)

The one-year waiver proposed in the NOPR also fails to give manufacturers the certainty they need to continue to maintain and operate their facilities for the production of large capacity electric resistance water heaters. At the Public Hearing, Harvey Sachs, the representative for the American Council for an Energy Efficient Economy agreed with this point, stating: “There is absolutely no way I can think of that I can bribe a manufacturer to gear up to manufacture a product for one year. I’ve dealt with a lot of utility regulators and have been one. There is no way that I could ask a utility or its management in the case of a co-op to support a one-year program.”[[41]](#footnote-41) Mr. Sachs had an excellent point. If a manufacturer does not know until shortly before a new year whether it will be permitted to produce a product in that year, it would be effectively impossible for that manufacturer to invest in the raw materials, employees, maintenance, and other resources required to be ready when the year starts. That is particularly true when, by waiting to see if it will be able to produce product “x” in the following year, the manufacturer may well make it impossible to produce alternative product “y” that next year should its waiver not come through in a timely manner.

This process imposes significant uncertainty and a significant administrative burden on both waiver applicants and DOE. Whatever assurances the current staff at DOE may offer as to the simplicity of this annual process, personnel and Administrations change. Moreover, the very nature of those transitions create uncertainty. Should the Assistant Secretary position, for example, become vacant and a protracted congressional nomination process ensues, it may be difficult for acting staff to understand and execute the waivers in a timely fashion given the large number of stakeholders involved.

We understand that DOE proposed the one-year waiver to provide utilities greater flexibility: to make it easier for them since they cannot easily predict the number of water heaters they will add to their programs far into the future. Such flexibility, however, is important, only if manufacturers are only permitted to produce the number of water heaters each year that each utility will need, and if those water heaters have to be customized to meet the individualized requirements of each utility. As noted below, such a requirement is just as impossible to implement in practice as the one-year waiver. And, without such a requirement, any justification for the one-year term of the waiver disappears.

## DOE Should Eliminate Its Proposed Restrictions On Waivers Because They Do Not Reflect Realistic Market Conditions

The NOPR would require waiver applicants to identify, among other things, the particular manufacturer, brand, model(s), rated storage volume, and energy factor for which a waiver is requested; identify the number of units per utility program on an annual basis for each of the basic models for which a waiver is requested; and identify and describe the control device that will be installed on each unit. These conditions do not reflect realistic market conditions and could not practicably be satisfied by any applicants.

* + 1. **Most Utilities Do Not Decide Which Water Heater From Which Manufacturer Customers May Use**

The NOPR appears to assume that there is a coordinated distribution network where manufacturers can work with utilities to determine how many units, which models, and which control devices will be needed to meet the needs of each individual utility program. There is no available process or easily developed process to comply with the proposal.

Cooperatives and manufacturers do not generally control the distribution chain of water heaters from point of manufacture to point of use, and it is impractical to expect that such distribution channels could be developed for this program. Generally, manufacturers produce water heaters and they are distributed through the same chains as other products, such as dishwashers and clothes washers. Customers typically purchase the water heaters they wish to buy, from the store or plumber they trust, from the manufacturer they prefer, and have the water heater installed in their home by the individual they choose. The utility will then traditionally come in and install a control device on the water heater, on the electrical circuit serving the water heater, on the breaker serving the water heater, or even on the utility meter.

**CUSTOMIZE THIS PARAGRAPH TO REFLECT YOUR OWN CONCERNS ABOUT THE PROPOSED WAIVER’S RESTRICTIONS.**Some utilities do distribute or install water heaters, but the number of those utilities is limited. Many utilities are actually prohibited by law or regulation from directly purchasing these water heaters and selling them to customers. Others have chosen not to participate in the sale and installation of water heaters to avoid starting a political war with local plumbing and HVAC contractors. Others have determined that their consumers would prefer not to purchase water heaters from the utilities and that it would significantly undermine their water heater programs if they were to be the exclusive distributor of eligible water heaters.

If the Department concludes that a waiver process is necessary, it must recognize these realities and not require utilities, working with manufacturers, to decide which model water heaters from which manufacturer customers may use. Rather, the waiver process must allow consumers to acquire the water heater they wish from the distributor they choose. A more restrictive waiver that requires the utility to directly intervene in the distribution process will immediately disqualify hundreds of utilities that are prohibited by law or market realities from applying for the waivers – and thus from the ability to maintain and expand their ETS programs.

## There Are No Universal Load Control Or Grid-Interaction Devices On The Market Today

As discussed above, the NOPR requires that the load control device on each water heater must be specified at the time of the waiver application. Cooperatives and manufacturers do not have a process in place, or an easy way to develop a process, that would allow every water heater to be manufactured with the exact load control device that will be needed in the field. Cooperatives use a wide variety of load control devices in their programs, and even a single system may use multiple control devices depending on the communications resources available throughout the territory. Many of those load control devices are not even connected to the water heater. Testimony at the Public Hearing indicated that some utilities connect their device to the studs or wall of the house. Others connect outside of the home. Some disconnect the water heater circuit directly, others disconnect a meter or a circuit with more than one household device attached to allow a greater level of DR.[[42]](#footnote-42)

If the water heaters that receive a waiver must be physically differentiated from most currently available electric resistance water heaters to demonstrate that they are “grid enabled,” there are several options that the manufacturers could implement at a reasonable price. They could install a load control device on the water heater, such as a ZigBee chip, that some load control programs could utilize to turn off the water heater. They could install a simple interface that would allow some load control devices to simply interconnect with the water heater. Or, they could separate out the water heater’s low-voltage circuit and make it readily accessible to a utility or electrician to allow the simple connection of a load control device.

**CUSTOMIZE THIS PARAGRAPH TO REFLECT YOUR OWN CONCERNS ABOUT THE PROPOSED REQUIREMENT FOR STANDARDIZED CONTROLLERS OR INTERFACES**DOE must recognize, however, that there is no universal controller or interface today. Utilities use dozens of different technologies to control water heaters, many of which do not directly connect with the water heater. Many of these differences are unavoidable because of differences in the communications infrastructure available to utilities in different areas of the country and because of differences in the legacy communications infrastructure, software, and other equipment each utility has in place. Moreover, there is no universal interface for water heaters or other appliances. While the standards for such an interface are being discussed by the National Institute of Standards and Technology and the Smart Grid Interoperability Panel and being studied by EPRI, there is no single consensus standard or set of standards today. Under the best case scenarios, it will be years before such a consensus could be reached.

For this reason, **INSERT NAME OF CO-OP** believes it is critical that any requirement for physical differentiation of products eligible for a waiver be flexible. If DOE requires a control device or interface be affixed to the water heater, the utility must be able to use a different control device or interface if the one included with the unit is not compatible with its system.

## DOE Should Not Impose A Limitation On The Number Of Units Provided Waivers

The NOPR describes a waiver process that sets a limit on the number of large-volume ESWHs that can be manufactured, but that limitation is impractical. As noted above, **INSERT CO-OP NAME** cannot tell each manufacturer how many units of which model their customers will install each year or stretch of years. It may be that the housing downturn will continue in our territory, slowing the opportunity to attract new participants into a program, or it may be that a new development will appear, bringing with it hundreds of new participants.

Moreover, it may be that the market shares of the manufacturers – and thus the number of water heaters each should produce – could change dramatically from year to year because one manufacturer may build a better mousetrap than another, enter into a better local distribution arrangement with the local plumbers or big box stores, or find a way to lower its prices compared to its competitors. If each manufacturer were limited to a predetermined number of units for each utility, the incentives for such improvements would largely evaporate. If a utility must be obligated to a certain number of units from a specific manufacturer for one or more years to qualify for a waiver, the utility and its customers will no longer be able to benefit from price or quality competition between manufacturers, raising the cost of DR programs for everyone.

If, as history suggests, DOE supports the rapid expansion of DR programs, it should not impose artificial limits on the growth in manufacture of the technologies needed by those programs. It should not impose limits on the competition that leads to innovation, better products, and lower prices. It should adopt a simple waiver that permits the existing competition between manufacturers to continue, as each manufacturer determines for itself how many of which products to produce for the market from year to year.

# There Are Far Simpler Approaches to Limit “Leakage” That Support DR Than Those Proposed In The NOPR Or At The Public Meeting

Many of the concerns that **INSERT CO-OP NAME** has with the NOPR are with provisions that appear to have been added to minimize leakage – the use of water heaters produced pursuant to a waiver outside of a DR program. These include the restrictions on the numbers of water heaters, the requirement that utilities and manufacturers reach agreement on the models of units and the control devices to be installed, and the one-year limit on the waiver. There were also several impractical suggestions raised at the Public Meeting that appear to arise from the same concern.[[43]](#footnote-43)

First, we believe the risk of leakage has been overstated. In contemplating the potential for program leakage, DOE is overlooking the fact that the main driver for the purchase of large-volume residential ESWHs in many communities is the utility programs themselves along with the incentives they provide. As explained at the Public Hearing, a typical large-volume ESWH unit must be bought at a premium of several hundred dollars over a smaller electric resistance unit. Most consumers who do not have huge families will not pay that premium without the program incentives (rebates, free maintenance, and future rate savings) provided through participation in a utility load control program.[[44]](#footnote-44) Therefore, leakage is already controlled naturally, and is unlikely to be significant compared to the benefits provided through ETS programs.

Second, an overemphasis on leakage would reflect an excessively narrow view of DOE’s mission. Not all kWhs are created equal. As Congress, DOE, and the White House have all recognized, it is far better for water heaters to consume kWhs in the middle of the night when wind turbines are producing more power than required by load than for them to consume kWhs at peak times during the day. It would be counterproductive for DOE to focus so heavily on leakage – on the consumption of a couple of extra kWhs – that it winds up imposing such heavy restrictions on grid-enable water heaters as to kill or even narrow the availability of utility ETS programs. That would lead to more kWhs consumed during peak hours, more investment in peaking generation, more operation of inefficient power plants, more carbon and criteria pollutants, and more cost to consumers. At the same time, it would lead to fewer kWhs consumed at night and more curtailment of wind generation.

Third, the focus on leakage assumes that the consumers who install a “leakage” water heater – one produced pursuant to the waiver but not used for DR – would have installed a large capacity heat pump water heater if DOE had not granted the waivers. That is highly unlikely. Customers currently have three major options for storage water heaters: a small capacity electric resistance water heater that costs in the range of $400, a large capacity electric resistance water heater that costs in the range of $700, and a large capacity heat pump water heater that costs over $2,000. Several witnesses at the Public Hearing testified that if customers were not given an incentive to purchase the $700 water heater by their utility’s DR program, they would buy the $400 water heater, not the $2,000 water heater.[[45]](#footnote-45) They have personal experience with that because some of them are also operating incentive programs to encourage customers who are not interested in the DR program to buy heat pump water heaters.[[46]](#footnote-46) In the experience of those who testified, only a small percentage of customers who are unable to buy the large capacity electric resistance water heater because of the absence of waivers or the aggressiveness of the conditions of those waivers are likely to spend $2,000 on the large capacity heat pump water heater. If they need more water, customers have the inexpensive but inefficient option of hooking two $400 water heaters together in series, because that is still half the cost of the heat pump water heater.

**INSERT ANY INFORMATION HERE THAT YOU MAY HAVE SUGGESTING THAT CUSTOMERS WON’T BUY LARGE-CAPACITY ESWHs IF NOT IN A DR PROGRAM**

Finally, DOE can avoid excessive leakage by requiring manufacturers to report to DOE the number of large-volume ESWHs they produce every year so that they can compare the production numbers to the information from an EIA form on which utilities would report the number of water heaters they added to their DR programs***.*** As the water heater manufacturer Vaughn testified at a Public Hearing,[[47]](#footnote-47) this would not be a significant burden on manufacturers. And EEI, NRECA, and APPA support use of the EIA forms.[[48]](#footnote-48) Adopting this approach would alleviate many of the problems associated with the waiver process proposed in the NOPR.

## Heat Pump Water Heaters do Not Perform The Same Function as Large-Capacity Electric Resistance Water Heaters

**PLEASE INSERT AT THE APPROPRIATE PLACES IN THIS SECTION ANY INFORMATION YOU MAY HAVE THAT SUGGESTS THAT HEAT PUMP WATER HEATERS WOULDN’T MEET YOUR DR NEEDS. IF YOU PROMOTE HEAT PUMP WATER HEATERS, PLEASE SAY SO AND BRIEFLY DESCRIBE YOUR EXPERIENCE WITH THEM AND THE NICHES THAT THEY DO AND DON’T FILL.**At the Public Hearing, General Electric (“GE”) contended that their heat pump water heaters can perform the same function as resistance heaters for load control programs. However, it became clear during the Public Hearing that heat pump water heaters are not a suitable replacement for large capacity electric resistance water heaters in DR programs.

First, in response to questions from the other attendees, GE noted that their products are hybrid water heaters and can only perform DR functions in element-only mode, which is the same technology as traditional water heaters.[[49]](#footnote-49) In this mode, the unit is either as efficient as or less efficient than traditional electric resistance water heaters. In GE’s testimony, they state that they do not have data on the efficiency of their heat pump unit in this mode,[[50]](#footnote-50) however it is apparent that the hybrid water heater operated in element-only mode could not meet the efficiency factor required by the 2010 standard. In element-only mode, the heat pump water heater effectively becomes an extremely expensive electric resistance product, not cost-effective enough to warrant utility investment in these programs and customers savings on their energy bills.

Second, as GE conceded in the Public Hearing, they do not currently permit utilities to control the element-only mode of their heat pump water heaters even if it were desirable.[[51]](#footnote-51) Additionally, a potential warranty issue with the manufacturer may result should the co-op interrupt the heat pump during load control if load control were available. If the utility is not permitted to control the heat-pump water heater, that product is simply incapable of being used in a utility DR program. It is an entirely different class of product.

Third, as a number of witnesses explained and as GE conceded in the Public Hearing, consumers have complained about the cost of heat pump water heaters, about the noise they make, about the heat that they draw from elsewhere in the house, and about the amount of room they require both physically and for drawing heat. [[52]](#footnote-52) The co-op witnesses explained that even if they could physically control the heat pump water heaters in their DR programs, they could not get enough consumers to install them to maintain their DR programs as a practical matter. The cooperatives need a product to be available to their consumers that is not only physically capable of meeting the cooperatives’ needs but that is also attractive to customers.[[53]](#footnote-53) GE had two responses to this concern at the Public Hearing. First, they made the bald assertion that utilities’ buying power would force manufacturers to produce an affordable, quiet, small, controllable heat pump water heater by 2015.[[54]](#footnote-54) That assurance provides utilities little comfort that the products we need – which are dramatically different from what GE sells today – will really be ready the year after next. Their second response was an ad hominem attack, charging that cooperatives are denying rural consumers the “advantage of progress,” *i.e.,* their products.[[55]](#footnote-55) Finally, GE’s heat pump water heaters are subject to certain technological limitations that make it difficult for them to provide key grid-interactive features.

* + 1. 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.

* + 1. 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.

* + 1. 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.

## No Additional Analysis Is Required Before Issuing a Waiver

During the Public Hearing, the National Resource Defense Council and EarthJustice requested that DOE conduct more quantitative analysis of the energy, economic, and environmental impacts that would result from a waiver under a range of foreseeable circumstances and at a reasonable variety of utility conditions.[[56]](#footnote-56) Moreover, a great deal of quantitative analysis has been performed and the results are clear. In response to the RFI on the impact of its amended energy conservation standards for residential electric water heaters on utility DR and energy storage programs,[[57]](#footnote-57) **INSERT CO-OP NAME IF YOU SUBMITTED COMMENTS IN RESPONSE TO THE RFI,** NRECA, PJM, APPA, EEI, and the Steffes Corporation (“Steffes”) submitted extensive data. Through those comments, DOE has determined that there are significant benefits of ETS programs provided by large-volume ESWHs as they stated in the NOPR. Additionally, countless studies outline the benefits of DR. Finally, as discussed above, it is stated federal policy to promote DR, electric storage, and renewable grid integration. Requesting additional analysis will only serve to delay the waiver process, which will increase program uncertainty and have a negative impact on ETS programs across the country.

Nothing in Section 6295(o)(2)(A) granting the Secretary authority to establish separate classifications for certain products or in Section 7194(a) granting the Secretary authority to grant waivers requires the Secretary to conduct an extensive econometric analysis evaluating all of the costs and benefits of the alternatives available to him to the tenth decimal place. The Secretary requires only an articulable and plausible reason – a reasonable basis – to believe that his choice provides consumers and the nation net benefits. To demand more of the Secretary now is only to pursue paralysis by analysis, and to undermine the clear policy goals established by Congress, the White House, and the Department to promote the expansion of DR programs.

1. **Conclusion**

For the foregoing reasons, **INSERT CO-OP NAME** respectfully requests that DOE grant the industry the relief requested.

Sincerely yours,

\_\_\_\_\_/s/\_\_\_\_\_\_\_\_\_\_\_\_\_

**INSERT YOUR NAME, TITLE, CO-OP NAME, ADDRESS, EMAIL ADDRESS, and PHONE NUMBER**

April 29, 2013

1. Energy Conservation Program for Consumer Products: Energy Conservation Standards for Residential Water Heaters, 78 Fed. Reg. 12,969 (Feb. 26, 2013). [↑](#footnote-ref-1)
2. Energy Conservation Standards for Residential Water Heaters, 78 Fed. Reg. at 12,974. [↑](#footnote-ref-2)
3. *Id.* at 12,970. [↑](#footnote-ref-3)
4. *Id.* at 12,972. [↑](#footnote-ref-4)
5. 42 U.S.C. § 6295(q) (2006). [↑](#footnote-ref-5)
6. *Id.* § 6295(o). [↑](#footnote-ref-6)
7. *Id.* § 6295(q)(1), (q)(1)(B), (q)(2). [↑](#footnote-ref-7)
8. *Id.* § 6295(m)(4)(A)(i); *see also* *id.* § 6295(n)(3)(B). [↑](#footnote-ref-8)
9. Public Utility Regulatory Policies Act of 1978 (“PURPA”), 16 U.S.C. § 2621(d)(6) (2006). [↑](#footnote-ref-9)
10. Energy Policy Act of 2005 (“EPAct”) § 1252(d), 42 U.S.C. § 2642(d) (2006). [↑](#footnote-ref-10)
11. EPAct, Pub. L. No. 109-58 § 1252(e)(a), 119 Stat. 594 (codified at 16 U.S.C. § 2642). [↑](#footnote-ref-11)
12. *Id.* § 1252(f). [↑](#footnote-ref-12)
13. *See* U.S. Dep’t of Energy, *Benefits of Demand Response in Electricity Markets and Recommendations for Achieving Them* (2006), *available at* http://eetd.lbl.gov/ea/ems/reports/congress-1252d.pdf.  [↑](#footnote-ref-13)
14. *Id.* at vii-viii. [↑](#footnote-ref-14)
15. *Id.* at 55. [↑](#footnote-ref-15)
16. Energy Independence and Security Act of 2007 (“EISA”) § 1301, 42 U.S.C. § 17381 (2006). [↑](#footnote-ref-16)
17. *Id.* § 529. [↑](#footnote-ref-17)
18. FERC & U.S. Dep’t of Energy, *The National Action Plan on Demand Response* 2 (2011). [↑](#footnote-ref-18)
19. *Id.* at 5 - 6. [↑](#footnote-ref-19)
20. *Id.* at 6 - 7. [↑](#footnote-ref-20)
21. *Id.* at 6. [↑](#footnote-ref-21)
22. Standards for Business Practices and Communication Protocols for Public Utilities, 78 Fed. Reg. 14,654 (Order No. 676) (March 7, 2013) (codified at 18 C.F.R. § 33); Demand Response Compensation in Organized Wholesale Energy Markets, 75 Fed. Reg. 47,499 (Order No. 745) (Aug. 6, 2010) (codified at 18 C.F.R. § 35), *see also*, <http://www.ferc.gov/industries/electric/indus-act/demand-response.asp>. [↑](#footnote-ref-22)
23. Executive Office of the President of the United States, *A Policy Framework for the 21st Century Grid: Enabling Our Secure Energy Future* 4 (2011), *available at* http://www.whitehouse.gov/sites/default/files/microsites/ostp/nstc-smart-grid-june2011.pdf. [↑](#footnote-ref-23)
24. *Id.* at 31 (footnotes and citations omitted). [↑](#footnote-ref-24)
25. *Id.* at 32. [↑](#footnote-ref-25)
26. *Id.* at 18. [↑](#footnote-ref-26)
27. Energy Conservation Standards for Residential Water Heaters, 78 Fed. Reg. at 12,972, 12,973. [↑](#footnote-ref-27)
28. *Id.* at 12,976. [↑](#footnote-ref-28)
29. FERC, *Assessment of Demand Response & Advanced Metering* (2012), *available at* http://www.ferc.gov/legal/staff-reports/12-20-12-demand-response.pdf. [↑](#footnote-ref-29)
30. Dataset, *available at* http://www.ferc.gov/industries/electric/indus-act/demand-response/2010/dr-data.xlsx. [↑](#footnote-ref-30)
31. Congress embraced development of the Smart Grid as part of national policy in the Energy Independence and Security Act of 2007. EISA § 1301. [↑](#footnote-ref-31)
32. EPRI, *Peak Load Shifting by Thermal Energy Storage* (2011). [↑](#footnote-ref-32)
33. American Wind Energy Ass’n, *AWEA U.S. Wind Industry Fourth Quarter 2012 Market Report* (2012), *available at* http://www.awea.org/membercenter/membersecurity/market\_report\_suite/upload/AWEA-Fourth-Quarter-Wind-Energy-Industry-Market-Report\_Member-Version.pdf. [↑](#footnote-ref-33)
34. Solar Energy Indus. Ass’n, *U.S. Solar Market Insight* (2013), *available at* http://www.seia.org/research-resources/us-solar-market-insight. [↑](#footnote-ref-34)
35. EnerNex Corp., *Eastern Wind Integration and Transmission Study* (2011), *available at* http://www.nrel.gov/docs/fy11osti/47078.pdf; Joseph H. Eto, et al., *Use of Frequency Response Metrics to Assess the Planning and Operating Requirements for Reliable Integration of Variable Renewable Generation* (2010); NYISO, *Growing Wind: Final Report of the NYISO Wind Generation Study* (2010), *available at* http://www.uwig.org/GROWING\_WIND\_-\_Final\_Report\_of\_the\_NYISO\_2010\_Wind\_Generation\_Study.pdf. [↑](#footnote-ref-35)
36. Frequency Regulation Compensation in the Organized Wholesale Power Markets, Fed. Reg. (Order No. 755) (Oct. 20, 2011) (codified at 18 C.F.R. § 35). [↑](#footnote-ref-36)
37. Matthew L. Wald, *Taming Unruly Wind Power*, NY Times, November 4, 2011, *available at* http://www.nytimes.com/2011/11/05/business/energy-environment/as-wind-energy-use-grows-utilities-seek-to-stabilize-power-grid.html?pagewanted=all&\_r=0. [↑](#footnote-ref-37)
38. At a bare minimum, 109 rural electric cooperatives in 22 states across the country will be immediately impacted by these standards. In addition, approximately 40 public power utilities and an additional number of investor owned utilities will be directly impacted. [↑](#footnote-ref-38)
39. Transcript of March 15, 2013 DOE hearing on the NOPR at 93, *available at* http://www.regulations.gov/#!documentDetail;D=EERE-2012-BT-STD-0022-0189 (hereinafter Transcript). [↑](#footnote-ref-39)
40. *Id.* at 44, 47, 50, 61, 82, 119 [↑](#footnote-ref-40)
41. *Id.* at 146-47. [↑](#footnote-ref-41)
42. *Id.* at 38, 105, 101, 120, 128, 210. [↑](#footnote-ref-42)
43. *Id.* at 206-07, 213-14. [↑](#footnote-ref-43)
44. *Id.* at 109. [↑](#footnote-ref-44)
45. *Id.* at 757-56, 109. [↑](#footnote-ref-45)
46. *Id.* at 62, 188 [↑](#footnote-ref-46)
47. *Id.* at 67. [↑](#footnote-ref-47)
48. *Id.* at 241. [↑](#footnote-ref-48)
49. *Id.* at 190-91. [↑](#footnote-ref-49)
50. *Id.* at \_\_\_\_. [↑](#footnote-ref-50)
51. *Id.* at 190-93. [↑](#footnote-ref-51)
52. *Id.* at 38, 43, 62, 127, 136, 188, 196. [↑](#footnote-ref-52)
53. *Id.* at 31, 125, 196. [↑](#footnote-ref-53)
54. *Id.* at 192-93. [↑](#footnote-ref-54)
55. *Id.* at 239. [↑](#footnote-ref-55)
56. *Id.* at \_\_\_\_. [↑](#footnote-ref-56)
57. Energy Conservation Program: Energy Conservation Standards for Residential Water Heaters, Direct Heating Equipment, and Pool Heaters, 75 Fed. Reg. 20,112 (April 16, 2010). [↑](#footnote-ref-57)