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November 20, 2014

Ms. Brenda Edwards
U.S. Department of Energy
Building Technologies Office, Mailstop EE-5B
1000 Independence Avenue SW
Washington, DC 20585

Re: RFI on amended efficiency standards for commercial water heating equipment
Docket No. EERE-2014-BT-STD-0042

Dear Ms. Edwards:

The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) is the trade association representing manufacturers of air conditioning, space heating, water heating and commercial refrigeration equipment. The AHRI member companies that manufacturer commercial water heating equipment account for well over 90% of all such equipment sold and installed in the U.S. We submit the following comments in response to the DOE's request for information (RFI) regarding amended efficiency standards for commercial water heating equipment issued in the October 21, 2014 Federal Register.

The RFI identifies several issues on which DOE is interested in receiving comments. Our comments will address each issue in the order they were presented in the RFI.

Issue 1: DOE requests feedback on the current equipment classes and seeks information regarding other equipment classes it should consider for inclusion in its analysis.

The current classes should be simplified. Based on the current energy conservation standards, these classes for commercial water heating equipment, excluding residential duty models, can be reduced to:

Electric storage	All
Gas Water Heaters and Hot Water Supply Boilers	≥ 10 Gal
Gas Water Heaters and Hot Water Supply Boilers	< 10 Gal
Oil Water Heaters and Hot Water Supply Boilers	≥ 10 Gal
Oil Water Heaters and Hot Water Supply Boilers	< 10 Gal

The classes for residential duty commercial electric storage water heaters should include a separate class for grid-enabled models. This was an oversight in the residential water heater rulemaking which should be avoided here.

Issue 2: DOE requests comment on whether the 155,000 Btu/h input capacity divisions in the current equipment classes for gas-fired and oil-fired storage water heaters are necessary.

As noted above, the 155,000 Btu/h input capacity division is no longer needed. The efficiency standards for models above and below that division are the same.

Issue 3: DOE seeks comment on whether to include commercial electric instantaneous water heaters and/or commercial heat pump water heaters in the scope of this rulemaking.

Commercial electric instantaneous water heaters and commercial heat pump water heaters should be included in this rulemaking. However, they should be considered as separate classes.

Issue 4: DOE seeks comment on whether to include both add-on and integrated commercial heat pump water heater types in the scope of this rulemaking.

We agree that both add-on and integrated commercial heat pump water heaters should be included. If integrated models are not included, heat pump models with minimal storage volume or models outside the definition of residential heat pump water heaters would be unregulated.

Issue 5: DOE seeks comment on whether to include both air-source and water-source commercial heat pump water heater types in the scope of this rulemaking.

We agree that both air-source and water-source commercial heat pump water heaters should be included.

Issue 6: DOE seeks information related to these or other efficiency-improving technologies. Specifically, DOE is interested in comments regarding their applicability to the current market and how these technologies improve efficiency of commercial water heating equipment.

The following technologies should not be considered in this rulemaking. Heat traps are no longer an applicable technology for commercial water heaters. In commercial installations, the application of heat traps is usually part of the piping system and are provided when the connections are made to the water heater(s). Since at least the 1999 Edition of 90.1, that standard has required the inclusion of heat traps on commercial water heaters at the time of installation. Thus heat traps are seldom provided as part of a commercial water heater.

Self-cleaning should be dropped because it is not a technology which improves efficiency within the context of DOE minimum efficiency standards and the related test procedures. It is a design feature that relates to maintenance concerns.

Fully condensing is not a technology that should be considered for commercial oil water heaters. The market for this class of water heater is very small compared to other classes. The challenges of developing fully condensing commercial oil water heaters are too significant for that small segment of the market.

We have no recommendations for other potential efficiency improving technologies.

Issue 7: DOE requests comment on approaches that it should consider when determining a baseline for equipment classes being transitioned to the uniform descriptor, including information regarding the merits and/or deficiencies of such approaches.

The baseline for equipment classes transitioning to the uniform descriptor should be determined using the current efficiency standards applicable to each class, converted to an equivalent minimum Uniform Energy Factor (UEF) requirement. Although we believe this is the only reasonable approach, it must be recognized that the uniform descriptor test procedure will provide a range of results for models of the same size that all comply with the thermal efficiency and standby loss standards, as applicable. Therefore the baseline should reflect the lowest UEF value determined from testing.

Issue 8: DOE requests information on max-tech efficiency levels achievable in the current market and associated technologies.

The maximum technologies are identified in the list discussed under Issue 6. The max-tech level should be addressed by each class of product. As an example, fully condensing is max-tech for gas-fired water heaters but not a viable max-tech for oil-fired water heaters.

Issue 9: DOE requests feedback on the planned approach for the engineering analysis and on the appropriate representative capacities and characteristics for each equipment class.

The use of a reverse-engineering approach for the analysis is acceptable. However, DOE must use appropriate cost estimates for components, material and labor.

We can provide information on representative capacities and characteristics once the equipment classes for the analysis are identified.

Issue 10: DOE requests comment on approaches to selecting efficiency levels for its analysis of amended SL energy conservation standards for gas and oil storage heaters, including the possibility of establishing discrete bins for one of the variables and establishing SL standards based on one instead of two variables.

DOE should analyze potential standby loss standards for gas and oil storage water heaters using the current structure of the standby loss standard. That structure recognizes that standby losses are affected by the area of the heat exchanger, usually flue tubes, and the area of the tank surface. The area of the heat exchanger does correlate to the input and the tank surface does relate to the tank volume. The development of this form to specify the standby loss standard was the result of deliberative, technical discussions. Any suggestion to consider alternative for the SL standard unnecessarily adds complexity to the analysis and would ultimately require test procedure changes. Those test procedure changes add burden with no benefit. Any alternative form of SL standard will not of itself reduce the standby losses of storage water heaters.

Issue 11: DOE requests comment whether to account for the impact of thermal efficiency on standby loss and on approaches to separate the effect of thermal efficiency from standby loss for gas storage heaters. This includes the possibility of separate standards for non-condensing and condensing units, as well as adding thermal efficiency to the current SL standard.

DOE should not consider any changes to the form of the SL standard. See response to issue 10.

Issue 12: DOE seeks input from stakeholders on whether the distribution channels described above are appropriate for commercial water heaters and are sufficient to describe the distribution market.

In addition to the distribution channels noted, DOE should address a channel that goes from the manufacturer to a manufacturer's representative, who then sells the unit to the customer.

Issue 13: DOE seeks input on the percentage of equipment being distributed through the different distribution channels, and whether the share of equipment through each channel varies based on equipment capacity or water heater class.

We have no information on this issue.

Issue 14: DOE seeks recent data and recommendations regarding data sources to establish the markups for the parties involved with the distribution of the equipment.

We have no information on this issue.

Issue 15: DOE requests comment on the overall method to determine water heating energy use and if other factors should be considered in developing the energy use or energy use methodology.

The proposed analysis to consider annual energy consumption across a range of applications based on building types and climate zones is overly complicated. Within any single building type, the water heater energy consumption will depend on the number of fixtures that use hot water and the number of occupants that use those fixtures. The analysis should start from the point that, in commercial applications, the water heating equipment has been properly sized to meet the anticipated load of the building, regardless of the building type or its location. From that starting point, the analysis can then consider the hot water use profile. That analysis is necessary since sizing is based on meeting the peak load condition which differs from the average daily hot water use profile.

Issue 16: DOE seeks input on the current distribution of equipment efficiencies in the building population for different equipment classes.

We have no information on this issue.

Issue 17: DOE seeks input on typical types and sizes (including fuel type, input capacity and rated volume) of commercial water heaters, including gas condensing and heat pump water heaters, used for different building types and applications.

We have no information on this issue.

Issue 18: DOE seeks input on representative hot water usage, water heating usage profile, water volumetric load profiles or aggregate loads, and representative hot water usage temperatures for various commercial water heater applications.

We have no information on this issue. When reviewing any such information that may be available from other sources, we encourage DOE to note whether the information is from recently collected data or from older studies. Some information from older hot water usage studies may be out-of-date for this analysis.

Issue 19: DOE seeks input and sources of data or recommendations for tools to support sizing of water heater typical commercial water heater and multifamily residential applications.

Our manufacturer members have sizing tools for commercial water heater installations. However, DOE must keep in mind that sizing methods are different than overall usage profiles.

Issue 20: DOE seeks input on the fraction and types of buildings that use recirculation loops associated with commercial water heaters and the impact of recirculation loops on water heater performance.

We have no information on this issue.

Issue 21: DOE requests comment on the fraction of commercial or residential boilers used in commercial water heating applications.

We have no information on this issue.

Issue 22: DOE requests comment on the fraction and classes of commercial water heaters which are used in residential-duty applications as well as other commercial water heaters that may serve residential multi-family buildings. DOE also requests input on the fraction of residential water heaters that are used for commercial applications.

We have no information on this issue.

Issue 23: DOE requests comment on the overall method that it intends to use to conduct the LCC and PBP analysis for commercial water heaters.

The overall method is acceptable. However, the key issue is the assumption and data that are used in the method.

Issue 24: DOE seeks input on the approach and data sources it intends to use to develop installation costs, specifically, its intention to use the most recent RS Means Mechanical Cost Data.

Although RS Means Mechanical Cost Data is a publically available source, we are not sufficiently familiar with the process by which the data is developed to be confident in its accuracy as actual installation costs.

Issue 25: DOE seeks comment and sources on its approach for developing gas, oil, and electricity prices.

We have no information on this issue.

Issue 26: DOE seeks input on the approach and data sources it intends to use to develop maintenance costs, specifically, its intention to use the most recent RS Means Facilities Maintenance & Repair Cost Data, as well as to consider the cost of service and/or maintenance agreements.

See response to Issue 24. Our same concerns about "RS Means" data applies here.

Issue 27: DOE seeks comment as to whether repair costs vary as a function of equipment efficiency. DOE also requests any data or information on developing repair costs.

We have no information on this issue. We do note that to the extent that higher efficiency equipment may incorporate added components or more complex controls, the repair costs of such models are likely to be correspondingly higher.

Issue 28: DOE seeks comment on its approach of using a Weibull probability distribution to characterize equipment lifetime. DOE also requests equipment lifetime data and information on whether equipment

lifetime varies based on equipment characteristics, equipment application, or efficiency level considerations.

We have no information on this issue.

Issue 29: DOE requests data on current efficiency market shares (of shipments) by equipment class, and also input on similar historic data.

We are unable to provide this information at this time. We are consulting with our members to develop information that addresses this issue and will provide it to DOE as soon as it has been collated.

Issue 30: DOE also requests information on expected future trends in efficiency for commercial water heaters classes, including the relative market share of condensing versus noncondensing equipment in the market in the absence of new efficiency standards.

We have no information on this issue.

Issue 31: DOE seeks comments and data on any rebound effect that may be associated with more efficient commercial water heaters.

We have no information on this issue.

Issue 32: DOE seeks historical shipments data for commercial water heaters by product class, particularly for product classes other than commercial gas and electric storage water heaters.

We are unable to provide this information at this time. We are consulting with our members to develop information that addresses this issue and will provide it to DOE as soon as it has been collated.

Issue 33: DOE seeks input on the approach and data sources it intends to use in developing the shipments model and shipments forecasts for this analysis.

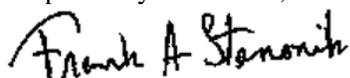
We have no information on this issue.

Issue 34: DOE requests comment and any available data on historical, current, and future market share of equipment with step changes in efficiency, such as gas condensing equipment and HPWHs, as compared to less efficient equipment, such as non-condensing gas water heaters and electric water heaters, respectively, for each equipment class.

We have no information on this issue.

AHRI appreciates the opportunity to provide these comments. If you have any questions regarding this submission, please do not hesitate to contact me.

Respectively Submitted,



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Chief Technical Advisor