October x, 2015

U.S. Department of Energy

Buildings Technologies Program

Sent via email: [ResFurnaces2014STD0031@ee.doe.gov](mailto:ResFurnaces2014STD0031@ee.doe.gov)

Re: Notice of Proposed Rulemaking for Energy Conservation Standards for Residential Furnaces, Docket EERE-2014-BT-STD-0031

We are writing to provide comments from the American Council for an Energy-Efficient Economy (ACEEE), on the Department of Energy’s (DOE) Notice of Data Availability (NODA) on efficiency standards for residential furnaces. ACEEE is a non-profit research and education organization founded in 1980 that has been involved in the appliance standards program since its inception. We participated in negotiations leading to the 1987 legislation and subsequent amendments that underlie the program and have been active participants in most DOE appliance standards dockets.

In developing these comments we have consulted with several other organizations, and as a result these comments are also endorsed by xxxx, yyyy and zzzz.

In general we find the data and analysis in the NODA very helpful and are using it in discussions with other parties in an effort to try to reach a joint recommendation for submittal to DOE. However, we also recognize that developing a joint recommendation will not be easy and that in the meantime the DOE rulemaking needs to proceed. In these comments we discuss:

1. The new DOE analysis and additional information it would be useful for DOE to provide;
2. Our recommendations on what DOE should propose in the forthcoming SNOPR, based on the analysis in this NODA.

**The DOE NODA Analysis**

In the NODA analysis, DOE separately analyzes potential standards for small furnaces, evaluating a range of break points for separating small furnaces from the rest of the market. We had recommended this analysis in our NOPR comments and are happy to see that DOE speedily prepared and published it. Multiple other stakeholders representing diverse interests also suggested that DOE consider size-based equipment classes. This analysis generally looks reasonable to us. However, we are unclear from the explanations provided whether three specific comments we made on the NOPR have been addressed. These comments are:

1. Make the Appendix 8L analysis using new venting technology the primary analysis;
2. Use a “shift” scenario rather than a “rollup” scenario for the main analysis, and;
3. Use the “low fuel switching” scenario for the main analysis.

Our prior comments provide the rationales and details for these suggestions.

In addition to these comments, we have two specific requests regarding this new analysis. First, p. 14 of the NODA notes that “DOE’s analysis accounted for the typical over-sizing of furnace capacity” and refers to NOPR Appendix 7B for details. However, this appendix is not very clear and therefore we request that these adjustments be more specifically described. We agree that over-sizing is prevalent for this equipment and therefore adequately adjusting for oversizing is imperative if DOE creates a separate product class and standard for small furnaces since furnaces a little over whatever size breakpoint DOE selects can commonly be downsized to take advantage of the laxer small furnace standard.

Second, in addition to the analysis DOE provides on shipments by furnace capacity, it would be useful to provide heat loss and sizing calculations on several prototypical homes in different climates to help stakeholders get a better handle on what size heating equipment is needed by different types of homes. Such an analysis can look at prototypical small, medium and large detached single-family homes as well as typical town and row houses. Both typical energy efficiency (as determined with RECS data) as well as new home energy efficiency (e.g., meeting the 2009 IECC that all states have either adopted or pledged to adopt) should be analyzed. We recall that DOE has developed such prototypes in other studies and hopefully these prototypes can be adapted to this purpose without too much time and trouble.

Our prior NOPR comments also discussed the report filed in this docket by GTI/AGA. In these previous comments, we supported two changes but rejected two other changes. We see that DOE agreed with us and has revised the analysis to:

1. Factor site-specific economics into whether a house has a condensing or non-condensing furnace in the baseline.
2. Use data on condensing furnace market share from 2010-2014 to determine the condensing unit market share going forward.[[1]](#footnote-1)

On the other hand, as we recommended, DOE did not increase the costs of condensing furnaces based on current costs nor change the fuel switching algorithm to substantially increase the number of homes that fuel switch. We suspect that GTI/AGA will repeat their arguments in favor of these latter two changes. Our rationales for rejecting these changes are contained in our NOPR comments and continue to apply.

Likewise, our NOPR comments about the small number of difficult to retrofit homes continue to apply. Furthermore, if small furnaces are allowed to remain non-condensing, the already small number of difficult to retrofit homes will decrease.

Finally, we agree with DOE’s analysis regarding low-income homes. As DOE shows in Table III.6 of the NODA, only 11-13% of low-income consumers experience net cost with a furnace standard levels of 92-95% AFUE if small furnaces are allowed to remain at 80% AFUE. Furthermore, as DOE notes in footnote 16, about 60% of low-income households either rent or live in public housing, and therefore the higher cost of a condensing furnace is paid in large part by the landlord and not the low-income tenant.

**The Forthcoming SNOPR**

In the NODA, DOE indicates that the next step in this rulemaking will be a SNOPR. In the SNOPR, we recommend that DOE propose:

1. That a separate product class be established for small furnaces, defined as an input capacity of 55,000 Btu/hour or less.
2. That for all other furnaces, DOE propose a 95% AFUE standard.

We discuss the rationales for these two recommendations in the sections below. We also recommend that DOE issue the SNOPR as soon as possible, since there will be another chance to comment on the SNOPR. Given the long-delays in finalizing this standard, we do not need a long period before the SNOPR.

*Set the Dividing Line between Small and All Other Furnaces at 55,000 Btu/hour*

Table II.2 in the NODA illustrates why 55,000 Btu/hour is the most appropriate boundary for the small furnace product class. With the boundary at 55,000, 15% of furnace shipments are in the small furnace class, but at the next potential dividing line (60,000 Btu/hour), this percentage jumps to 32%, and further increases to 38% for a dividing line of 65,000 Btu/hour. If 53% of furnace shipments are now condensing, and 32% are small furnaces that are allowed to remain non-condensing, then this rule will only affect a small portion of sales, resulting in only modest impacts. This point is also illustrated in Table III.8 – setting the dividing line at 60,000 Btu/hour instead of at 55,000 reduces energy savings by 0.6-0.7 quads for standards at 92-95% AFUE. And at a dividing line of 65,000 Btu/hour, savings decline by 1.1-1.3 quads relative to a dividing line of 55,000 Btu/hour. The same holds true for consumer net economic benefits as shown in Tables III.9 and III.10. Consumer net economic benefits are maximized with a boundary of 50,000 or 55,000 Btu/hour and, at higher dividing lines, benefits decrease by hundreds of millions of dollars at a 7% discount rate and by billions of dollars at a 3% discount rate.

*Set the Standard for All Other Furnaces at 95% AFUE*

Using the 55,000 Btu/hour dividing line discussed above, as shown in Table III.11, both energy savings and net consumer benefits are significantly higher for a 95% AFUE standard than for a 92% AFUE standard. A 95% standard saves 4.1 quads, vs. only 2.9 quads for a 92% standard. At a 7% discount rate, a 95% standard has net consumer benefits of $4.6 billion, which is $1.1 billion higher than for a 92% standard. At a 3% discount rate, the 95% standard saves consumers $5.2 billion more than a 92% standard (Table III.10).

In the NOPR, DOE rejected a 95% standard based on concerns about manufacturer impacts. As discussed in our NOPR comments, we believe that all major manufacturers have 95% AFUE models and from the shipment data included in AGA’s NOPR comments, these units of approximately 95% AFUE make up a larger portion of current furnace sales (23%) than units of approximately 92% AFUE (13%). Also, the difference in capital conversion costs between 92% and 95% standards was small, and by eliminating capital conversion costs for small furnaces, the difference will be even smaller. Furthermore, it looks to us that the manufacturer impact analysis treats fuel switching to heat pumps as lost income to manufacturers which we believe is incorrect. Our rationales for these points are described in more detail in our NOPR comments.

*Possible Alternatives*

We believe that the case for a 95% AFUE standard for units over 55,000 Btu/hour is compelling. We believe that ultimately a standard needs to be set at these levels. However, if it will decrease adverse impacts, we are open to a two-step standard. A two-step standard could entail a lower AFUE (i.e., 92%) or higher input capacity breakpoint to start, with a second step based on 95% AFUE for furnaces larger than 55,000 Btu/hour. For example, the first step might take effect concurrently with the furnace fan standard, reducing the need for manufacturers to retool and retest equipment twice and the second step could take effect a number of years later.

**Conclusions**

In conclusion, we commend DOE for conducting these additional analyses and issuing this NODA. We recommend that DOE refine its analyses to incorporate new venting technologies and a lower rate of fuel switching and that DOE provide some additional information that will help stakeholders provide input on the dividing line between small and all other furnaces. We recommend that DOE speedily issue a SNOPR, and in this SNOPR propose a standard of 95% AFUE for furnaces with an input capacity above 55,000 Btu/hour.

We look forward to the completion of this rulemaking in the first part of 2016. The standard has been set at non-condensing levels of performance since they were first enacted in 1987 and a requirement to move the substantial majority of furnaces to condensing levels of efficiency is long overdue.

Please let us know if you have any questions about these comments.

Sincerely,

 

Steven M. Nadel Harvey M. Sachs

Executive Director Senior Fellow

Other organizations supporting these comments:

[list with organization and contact name]

1. However, we note that the market share of condensing furnaces has been pretty flat over the period. We recommend that DOE assume a flat condensing unit market share throughout the analysis period. [↑](#footnote-ref-1)