AIR-CONDITIONING, HEATING, & REFRIGERATION INSTITUTE
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2111 Wilson Boulevard Suite 500 Arlington VA 22201-3001 USA
Phone 703 524 8800 | Fax 703 562 1942
www.ahrinet.org

April 6, 2015

Ms. Brenda Edwards
U.S. Department of Energy
Building Technologies Program, MS EE-2B
1000 Independence Avenue, S.W.
Washington, D.C. 20585-0121

Re: Docket No. EERE–2013–BT–STD–0021
NOPR Revised Commercial Furnace Efficiency Standards

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 furnaces account for the large majority of all commercial gas and oil furnaces that are sold and installed in the U.S. We submit the following comments in response to the Notice of Proposed Rulemaking for amended efficiency standards for commercial furnaces issued in the February 4, 2015 Federal Register.

We support the Department of Energy's (DOE) conclusion insofar as it determined that the efficiency standard for commercial furnaces, which is technologically feasible and economically justified, is an efficiency level that does not require the use of condensing designs in these products. AHRI's June 3, 2013 comments in response to DOE's May 2, 2013 request for information on this subject noted significant issues and concerns with efficiency levels that would require the use of condensing technology. We appreciate that DOE has properly considered those issues and concluded that energy efficiency levels more stringent than proposed in the NOPR have potential burdens that outweigh the projected benefits.

However, we do not support the proposed revised minimum thermal efficiency (E_t) standard of 82% for either gas or oil commercial furnaces. A minimum E_t of 82% for an outdoor commercial furnace has potential burdens that DOE's analysis either has not recognized or has not evaluated properly. Attachment 1 is a graph of surface temperature vs. time for flue gas bearing components of a residential weatherized gas furnace at several AFUE levels. We first provided this information to DOE at a meeting we had with the staff in December of 2006. The two things to note are that if the surface temperature is below the dew point temperature of natural gas, condensation will occur on the surface of the component; and if the surface temperature does not exceed the natural gas dew point temperature during the burner on cycle, the component remains wet during the entire burner on time. This repeated circumstance of the surface being constantly wet leads to corrosion problems unless other measures are taken by the manufacturer to mitigate the situation. Although this graph is specific to residential gas furnaces, the underlying physics also apply to commercial gas furnaces. The 81.5% AFUE line does approximate the performance of a commercial furnace at 82% E_t in the field when it is considered that the ambient for the commercial furnace is well below 70F. This graph shows that at an AFUE of 81.5% the surface of the component will not be dry by the time the burner turns off. In the field the burner on cycle will vary based on the building's HVAC system and the weather conditions. When all these factors are considered together, it leads to a conclusion that many installations of commercial gas weatherized furnaces with an

E_t of 82% will see periods of excessive condensation within the unit. Using the climate zone map, Figure B-1, in ASHRAE Standard 169, an analysis by one of our members indicated that any weatherized commercial furnace installation in climates zones 4 through 8 is likely to have excessive condensation occur within the unit. About 60% of all commercial installations are in those climate zones. It should be recognized that this is a conservative estimate since other factors of the building HVAC system design and operation may result in condensation occurring in an 82% commercial furnace installed in one of the lower number climate zones.

The key point is that if the minimum is established at 82%, many units of commercial furnaces will be installed in outdoor conditions where excessive condensation will occur to the point of causing heat exchanger failure or vent system corrosion. If manufacturers do not redesign their commercial furnace models to counter this anticipated field condition, the safety, reliability and durability of those higher efficiency units will not be at the same level as products being provided by the industry today. From the manufacturer's perspective, a degradation in safety, reliability and durability is unacceptable. They will have to modify the design to improve the model's ability to withstand excessive condensation on the heat exchanger and in the venting system. As a consequence, the manufacturer's cost to produce models complying with the 82% E_t minimum will be significantly more than DOE's analysis estimates. From the perspective of DOE's analysis, models at 82% E_t, as envisioned by the analysis, will not last as long, on average, as current models and they will require more maintenance.

Most commercial furnaces are installed outdoors as part of a packaged commercial air conditioning and heating unit, commonly referred to as roof top units or RTUs. As a result, these units are exposed to a set of field conditions that are normal for the specific product, but unique for the broader category of furnaces. These installation conditions relate both to how the unit will operate in the field and to the context in which the efficiency rating of the model must be considered.

The significant factors of outdoor installations of commercial furnaces are:

> During operation, the unit will be in an ambient temperature ranging from 40F to -40F. Unlike residential buildings, commercial buildings do not require heating until outdoor temperatures are about 40F because of the heat being generated by the occupants and devices being operated in the building. When commercial furnaces are tested in a laboratory either for determining compliance to the applicable safety standard or for determining an efficiency rating, the test units are in an ambient condition ranging from 65F to 85F. The unit as installed outdoors will lose more heat through the jacket and vent system compared to the performance of the furnace measured under laboratory conditions.
>
> The air supplied to the furnace for combustion will be outdoor air that will likely not be warmer than 40F and may be as cold as -40F. As noted, this is significantly colder than the ambient air provided to the unit during testing in a laboratory.

The effect of these conditions is to erode, and in foreseeable cases, eliminate the amount of energy available in the products of combustion that keep the water generated in the combustion process in a gaseous state (i.e. water vapor). A furnace operating at 82% thermal efficiency in a laboratory will not experience excessive condensation either on the heat exchanges or in the vent system. That same unit operating outdoors in an environment that will be subfreezing or even subzero will experience excessive condensation depending on the particulars of the installation. In the interest of their customers, manufacturers would have to redesign their models to mitigate this risk. That redesign will encompass more than a simple boost of the thermal efficiency.

An examination of AHRI directory of certified ratings for commercial furnaces does not show a single listing of a commercial gas weatherized furnace with a thermal efficiency of 82%. This is not happenstance but a practical example of how the field conditions described above have caused manufacturers to design models at a level of efficiency that will not compromise the safety, durability and reliability of current designs.

We have the following responses to the issues identified by DOE in the February 4, 2015 Federal Register notice.

1. The use of proprietary designs and patented technologies in CWAF, and whether all manufacturers would be able to achieve the proposed levels through the use of non-proprietary designs.

The proposed 82% E_t level can be achieved without the use of proprietary designs or patented technologies. However, the design changes that will be needed to maintain the current level of safety and reliability in a model designed to have an E_t of 82% may require proprietary designs such as special features to address the condensation expected to occur in the unit.

2. The proposed scope of coverage and equipment classes for this rulemaking. In particular DOE seeks comment on whether there is a need for separate equipment classes for units designed to be installed indoors (i.e., "non-weatherized" units) and units designed to be installed outdoors (i.e., "weatherized" units) due to the potential need to manage acidic condensate and the potential for condensate freezing after exiting the furnace.

The vast majority of commercial gas furnaces are weatherized models. Conversely, all the oil commercial furnaces listed in AHRI's directory are non-weatherized models. Given this situation and the efficiency levels proposed in the NOPR, there does not appear to be any reason or benefit to consider separate equipment classes as presented above.

3. The technologies identified in this rulemaking, as well as the technologies which were primarily considered as the methods for increasing thermal efficiency of commercial warm air furnaces.

No comment.

4. The potential for lessening of product utility for CWAF meeting the proposed standards and whether the proposed standards would likely result in the unavailability in the United States of any covered product type (or class) of performance characteristics (including reliability), features, sizes, capacities, and volumes that are substantially the same as those generally available in the United States.

The product utility will be lessened in terms of the units being less reliable and durable unless additional changes, not anticipated or analyzed in the TSD, are made to the models. These added changes do add cost for the manufacturer to produce an 82% model that maintains the same level of utility. Also, increased heat exchanger size may require an increase in the size of the area within the RTU where the furnace is located, which may require the RTU to be larger. This will not affect product availability but will present problems for some replacement situations, which may not easily accommodate a larger RTU.

5. The efficiency levels analyzed for gas-fired and oil-fired commercial warm air furnaces. In particular, DOE is interested in the feasibility of the max-tech efficiency levels, as well as the ability of non-condensing technologies to meet the 82 percent thermal efficiency level for gas-fired commercial furnaces. DOE also seeks comment on whether an 82 percent thermal efficiency standard would shift production to condensing technology if manufacturers, for example, would need to design their

equipment to a level slightly higher than the DOE standard due to the margin of error associated with the test methodology. In addition, DOE is interested in whether the accuracy of the results from the test method would support measuring thermal efficiencies to the tenth decimal place such that DOE could consider 81.5 percent or some other fraction as a potential standard level as opposed to rounding the standard to the nearest whole number.

We agree that the max tech condensing level is practically infeasible. The proposed 82% minimum standard does not push manufacturers to condensing technology. Rather, as we had explained above, it requires redesign and added cost to minimize potential problems of condensation in the field. This issue does correctly identify test accuracy and production variability as other factors that manufacturers must address. If a model is rated at 82% there will be individual units of that model that will have efficiencies above 82%. Those particular units will come off the production line with a slightly increased risk for excessive condensation because of that above-average efficiency. We do not believe that DOE should consider specifying the minimum standard to the tenth decimal place. A standard in that format would not make much difference in the actual energy saved by the revised minimum.

6. The applicability of the teardown units at 250,000 Btu/h and 400,000 Btu/h input capacities to represent the range of potential input capacities on the market.

We agree that this is an issue that warrants consideration. On a practical basis, the largest size furnaces that are covered by this NOPR have input ratings of 2,000,000 Btu/h. The results of the teardown analysis do not extrapolate to those or similar high input models. One reason for that is that the number of higher input commercial furnaces shipped is significantly lower than the shipments of units at an input rate of 400,000 Btu/h or smaller. The entire commercial furnace market is not a "high-production volume" level. The higher input models are the lesser part of that low volume production. The manufacturing costs for higher input models have more in common with hand-built units as opposed to units produced in high numbers on an assembly line. The information obtained in the teardown analysis has applicability only to models with input rates not above 400,000 Btu/h.

7. The incremental manufacturing costs above the baseline cost at the efficiency levels considered in the engineering analysis, which DOE estimates to be $10 for gas-fired CWAFs and $24 for oil-fired CWAFs at the proposed standard level.

DOE's estimates are too low. The estimates do not include either the added costs required to maintain the current level of safety, reliability and durability, as discussed above, or the added cost to redesign the casing of the RTU to accommodate a larger heat exchanger or the relocation of other components because of that larger heat exchanger.

8. The approach used to estimate the trend for future CWAF consumer prices.

The approach DOE used to estimate the trend for CWAF consumer prices is inadequate. In the TSD, DOE states that "Because data specific to CWAF consumers are not available, DOE used a price elasticity developed for residential applications."[1] However, the residential information upon which DOE bases its assumptions is not sufficient to meet the requirement of clear and convincing evidence as required by EPCA.[2] First, the data developed as part of the residential rulemaking is not subject to the higher commercial clear and convincing analysis. Second, DOE provides no analysis in support of why residential consumers are a sufficient proxy for commercial equipment purchasers. In the TSD, DOE concludes that residential consumers have inelastic demand of -0.34, based upon the impact of purchase

[1] NOPR TSD Chapter 9.4.1, page 9-8.
[2] 42 U.S.C. § 6313(a)(6)(A)(ii)(II).

price, operating cost, and household income. It also notes that the measure is based on a small data set, and states:

> "More importantly, the measure is based on an assumption that economic variables, including purchase price, operating costs, and household income, explain most of the trend in appliances per household in the United States since 1980. Changes in appliance quality and consumer preferences may have occurred during this period, but DOE did not account for them in this analysis. Despite these uncertainties, DOE believes that its estimate of the relative price elasticity of demand provides a reasonable assessment of the impact that purchase price, operating cost, and household income have on equipment shipments."

In the TSD (page 9-8) it is noted that residential households make very different purchasing decisions than commercial contractors, wholesalers and building owners. By DOE's own admission, household income was key to its analysis and it is entirely inapplicable to a CWAF purchase decision. Furthermore, in order to perform its analysis over the requisite time period, DOE needed to estimate relative price elasticity over time, and since again it lacked adequate information, it turned to a different substitute – cars.

> DOE . . . was unable to identify sources specific to household durable goods, such as appliances, to indicate how short-run and long-run price elasticities differ. Therefore, to estimate how the relative price elasticity changes over time, DOE relied on a study pertaining to automobiles. This study shows that the automobile price elasticity of demand changes in the years following a purchase price change, becoming smaller (more inelastic) until it reaches a terminal value around the tenth year after the price change. Table 9.4.1 shows the relative change in the price elasticity of demand for automobiles over time.

DOE's reliance on residential purchases to establish commercial product price elasticity and on car purchases to extend that analysis over time clearly fails to meet the high standard of clear and convincing evidence required to implement a standard higher than ASHRAE 90.1 for CWAF equipment. It is not a requirement for DOE to implement a standard higher than ASHRAE, in fact as noted below it was Congress' intent that ASHRAE 90.1 would be the standard adopted unless DOE could meet a higher burden to show something more. DOE has failed to meet that burden here.

AHRI recognizes the importance of all stakeholder participation in the rulemaking process, and encourages the submission of relevant data to DOE as part of that process. But when, as here, the data is lacking, DOE cannot shift the burden to manufacturers to provide data or suffer the consequences of DOE's reliance on clearly inapplicable analysis. If the data is lacking, then DOE may not be able to meet the higher evidence burden under EPCA's commercial provisions, and a higher standard than ASHRAE 90.1 will be unjustified. But what DOE cannot do is rely on data that is clearly inapplicable to conclude that price increases will have a reduced impact on consumer demand and manufacturer shipments. This does not meet the required showing and it understates the costs of DOE's proposed rule, rendering the cost benefit analysis insufficient under the statute.

9. The approach of using CBECS and RECS data for determining the energy consumption of CWAF in residential and commercial buildings.

Although we have some concerns about the process in which the CBECS data is analyzed, and we are unconvinced that RECS data needs to considered at all, there is a more immediate concern. Information on the 2012 CBECS survey will be released over the course of the next few months. Tables on end-use equipment, energy sources and use are scheduled to be available in May. Information on consumption is scheduled to be released in September. Since the 2012 CBECS data better reflects the current stock of commercial buildings and includes all the improvements in commercial building energy consumption that

have occurred in the 9 years since the 2003 CBECS survey was conducted, it is essential that, if this analysis uses CBECS data, it use the most current information. If that means a delay in this rulemaking, so be it. This rulemaking should not be completed based on an analysis that utilized 2003 CBECS data.

10. The analytical methodology to estimate the annual energy use for CWAF.

The estimate of annual energy use does not account for the fact that more heat exchanger or other design changes necessitated by an 82% minimum standard will add restriction to the air flow through the unit. This will increase the energy use of the blower motor and reduce the overall savings of the 82% standard.

11. The approach and data sources used for assessing changes in installation costs for more-efficient CWAF.

Although an 82% unit does not employ condensing technology, the ambient conditions of units installed outdoors at this efficiency level may require the installation of a condensate disposal system as part of the approach to address the excessive condensation that may occur.

12. The methodology and data sources used for assessing changes in maintenance and repair costs for more-efficient CWAF.

As noted above, repairs and maintenance will be required more often because of increased condensate problems.

13. The approach used to determine the lifetimes for CWAF and whether the lifetimes assumed in the analysis are reflective of CWAF equipment covered by this rule. In addition, the agency is seeking comment on whether the energy efficiency standards would be expected to affect the lifetime of the products covered by the proposed standards.

The analysis overestimates the average lifetime of a commercial furnace. The proposed revised standard, will be reduce the life of the equipment unless additional design changes are made. The manufacturer will redesign the models as necessary to maintain the current level of durability. Thus, DOE's analysis must account for this additional cost to the units.

14. The potential for a rebound effect associated with higher efficiency standards for the covered furnaces in both commercial and residential installations.

We agree there is minimum rebound effect associated with a higher efficiency standard for commercial furnaces.

15. The appropriate base case distribution of energy efficiencies for CWAF in 2018 (compliance year of the standard) in the absence of amended energy conservation standards.

No comment at this time.

16. DOE's methodology and data sources used for projecting the future shipments of CWAF in the absence of amended energy conservation standards. Specifically, DOE is interested in the historical data from the past 10 years for CWAF.

We have no information to provide at this time.

17. The potential impacts of amended standards on product shipments, including impacts related to equipment switching.

The proposed minimum of 82% may cause some switching of equipment because of installation complications resulting from larger units and modifications to handle condensate disposal.

18. The methodology used to determine long-term changes in CWAF energy efficiency independent of amending energy conservation standards.

No comment.

19. Consumer subgroups that should be considered in this rulemaking.

No comment.

20. The approach for conducting the emissions analysis for CWAF.

The approach used 2013 AEO information. As noted below in response to item number 21, more current information is available and should be used.

21. DOE's approach for estimating monetary benefits associated with emissions reductions, including the SCC values used.

As DOE notes in the NOPR, EPCA's very core is the performance of a detailed, multi-factor cost-benefit analysis. *See* 42 U.S.C. § 6313(a)(6)(B)(ii) ("In determining whether a standard is economically justified, . . . the Secretary shall, after receiving views and comments furnished with respect to the proposed standard, determine whether the ***benefits of the standard exceed the burden*** … ***to the maximum extent practicable***") (emphasis added). As DOE notes, for commercial equipment, the result of this analysis must be clear and convincing evidence that a standard more stringent than ASHRAE is justified. However, DOE's evidence fails to reach this standard and is not convincing because: 1. the overwhelming majority of benefits claimed by DOE are speculative and tangential at best, such as emissions reductions and global social cost of carbon (SCC) for the world population extrapolated out beyond the year 2100; and 2. DOE's cost benefit analysis does not treat costs and benefits on an equal basis and is fundamentally and unfairly biased to undervalue the costs of the rule. This approach effectively renders many of the required factors that DOE must consider meaningless. In doing so, DOE is ignoring the clear congressional intent in including the seven factors in the statutory text. *See* 42 U.S.C. § 6313(a)(6)(B)(ii).

a. Failure to Use the Most Recent Data in the Social Cost of Carbon (SCC) and Other Supporting Analysis.

Throughout the NOPR, DOE relies on data from the *Annual Energy Outlook 2013 (AEO 2013) (See, e.g.,* 80 Fed. Reg. 6,182, 6,184; 6,186; 6,200; 6,203; 6,204; and 6,208) and not on the Annual Energy Outlook 2014 (AEO 2014). DOE fails to even mention that more recent data is available in AEO 2014, and has been since (depending on the section involved) April and May 2014.[3] DOE's failure to use AEO 2014 data or even acknowledge it is available renders DOE's entire cost benefit analysis deficient. Contrast DOE's approach here with its analysis from other recent rulemakings, where it at least acknowledged AEO 2014 was available and said it would revisit its analysis with the most recent data.[4] AEO 2014 has been available for nine months, and DOE's failure to use the data in its analysis is arbitrary and without basis. In fact, in the recent Residential Furnace rulemaking, issued just over a month after the CWAF NOPR, DOE appropriately used AEO 2014 data in its analysis.

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[3] *See* AEO 2014, *available at* http://www.eia.gov/forecasts/aeo/pdf/0383(2014).pdf (dated on its cover "April 2014"); AEO 2014 website, http://www.eia.gov/forecasts/aeo/ (website for the publication listing some sections as available on various dates in April 2014 and other sections as available on May 7, 2014).

[4] *See Energy Conservation Standards for Small, Large, and Very Large Air-Cooled Commercial Package Air Conditioning and Heating Equipment*, 79 Fed. Reg. 58,948, 58,950 at n.7 (referring to "[e]missions factors based on the Annual Energy Outlook 2014 (AEO 2014), which became available too late for incorporation into this analysis"). DOE cannot make the same claim in this NOPR, as it relies on other data that was made available at the same time as AEO 2014. *See* 80 Fed. Reg. at 6,201 notes 38-42.

The critical importance of this issue is illustrated by DOE's own concessions in the Small, Large, and Very Large Air Cooled Commercial Package Air Conditioning and Heating Equipment (CUAC) rulemaking, in which DOE noted that use of the AEO 2014 data would significantly reduce the environmental benefits resulting from reductions of CO_2, SO_2, and Hg, among other emissions:

> Emissions factors based on the Annual Energy Outlook 2014 (AEO 2014) . . . indicate that a significant decrease in the cumulative emission reductions of carbon dioxide, methane, nitrous oxide, sulfur dioxide, nitrogen oxides and mercury from the proposed standards can be expected if the projections of power plant utilization assumed in AEO 2014 are realized. For example, the estimated amount of cumulative emission reductions of CO_2 are expected to decrease by 36% from DOE's current estimate (from 1,085 Mt to 697Mt) based on the projections in AEO 2014 relative to AEO 2013. The monetized benefits from GHG reductions would likely decrease by a comparable amount.

79 Fed. Reg. at 58,950 n.7. DOE's use of AEO 2013 without comment for the CWAF NOPR is particularly egregious as DOE cites the CUAC rulemaking in the CWAF NOPR.[5] This is not consistent with the theory or practice of notice and comment rulemaking. "[One] purpose of notice-and-comment provisions under the APA . . . is 'to ensure that affected parties have an opportunity to participate in and influence agency decision making at an early stage, when the agency is likely to give real consideration to alternative ideas.'" *Nat'l Ass'n of Clean Water Agencies v. EPA*, 734 F.3d 1115, 1148 (D.C. Cir. 2013) (quoting *N.J., Dep't of Envtl. Prot. v. EPA*, 626 F.2d 1038, 1049 (D.C. Cir. 1980)). DOE's proposed course of action denies stakeholders the ability to adequately review and comment on DOE's analysis. We know that DOE's benefits will drop by more than one third in the case of the most important greenhouse gas and we know that DOE will need to revise the analyses it built on top of that analytical foundation. But what AHRI does not know is the precise impact of those changes on the analysis. All stakeholders must see the ensuing analysis using the most up-to-date inputs in order to frame comments around it. Undeniably, AHRI's and its members' rights to comment cannot be effectively eliminated by shunting them away from the only stage where the opportunity for filing comments matters, which is now — at the proposed rule stage.

The Administrative Procedure Act (APA) Section 553 concerning notice-and-comment rulemaking is "one of Congress's most effective and enduring solutions to the central dilemma it encountered in writing the APA reconciling the agencies' need to perform effectively with the necessity that 'the law must provide that the governors shall be governed and the regulators shall be regulated, if our present form of government is to endure.'" *Am. Bus Ass'n v. United States*, 627 F.2d 525, 528 (D.C. Cir. 1980) quoting S. Doc. No. 248, 79th Cong., 2d Sess. 244 (1946). It is thus incumbent on DOE to issue a supplemental notice of proposed rulemaking that revises the analysis based on AEO 2014 data so that AHRI and other stakeholders may comment upon the analysis done using the most up-to-date inputs. Once DOE issues a final rule, it will prove too late to file such comments and AHRI's only option will be litigation, where the rule will (if a supplemental notice is not issued) at that point be infected with a fatal procedural error. The right outcome — for DOE, for AHRI, and for other members of the public — is to issue a revised analysis based on AEO 2014 now.

b. Use of Different Discount Rates that Understate the Costs to Manufacturers.

DOE uses multiple different discount rates in the NOPR in calculating the present value of benefits and costs. In doing so, DOE uses unreasonably high discount rates to assess manufacturer costs without explanation and in an arbitrary manner. For example, DOE discounts the INPV for

[5] 80 Fed. Reg. at 6,202 (n.45).

manufacturers of CWAF at a rate of 8.9 percent to $74.7 million in 2013$ - and even so the loss ranges from 58.0 percent to 14.9 percent of Industry Net Present Value (INPV).[6] However, for consumer costs the discount rates are 7 and 3 percent, and DOE uses 7, 5 and 3 percent rates for the SCC. This is the case even though DOE notes that the interagency group that developed the SCC determined that a range of values from 7 percent to 23 percent should be used to adjust the global SCC to calculate domestic effects.[7] As a result, DOE should revise its analysis to reflect appropriate and comparable discount rates for all future costs, or should provide its justification for the use of different rates, and clearly explain, if costs are appropriately analyzed under different rates, how they are deemed comparable for purposes of the cost benefit analysis.

c. Provisional, Revisable, Imperfect and Incomplete Data such as the Monetization of SCC Cannot form the Basis for DOE's Finding of Clear and Convincing Evidence.

DOE itself acknowledges the uncertainty of its SCC claims repeatedly in the CWAF NOPR, including that the SCC estimates are "provisional." Even the interagency group that developed the SCC recognized that the underlying models were "imperfect and incomplete." DOE states that a recent report from the National Research Council noted that any assessment would suffer from uncertainty, speculation and lack of information.[8] One of the main reasons the analysis is uncertain is that it relies on IPCC analysis concerning climate sensitivity. But the IPCC has conceded that "[n]o best estimate for equilibrium climate sensitivity can now be given because of a lack of agreement on values across assessed lines of evidence and studies." *IPCC, 2013: Summary for Policymakers* at 16 n.16, *available at* http://www.climatechange2013.org/images/report/WG1AR5_SPM_FINAL.pdf.

The use of such analysis as the foundation of a proposed energy efficiency standard is not without real and irreparable harm to manufacturers, due to EPCA's so-called "anti-backsliding" provision. 42 U.S.C. §6313(a)(6)(B)(iii)(I). As DOE notes at page 6,187 of the NOPR, the "anti-backsliding" provision prohibits the Secretary from prescribing any amended standard that increases the maximum allowable energy use or decreases the minimum required energy efficiency of a covered product. So, when DOE's states that "any value placed on reducing CO_2 emissions in this rulemaking is subject to change"[9] and that happens, as it did from AEO 2013 to AEO 2014, and the previous determination is found to have overstated the benefits (by as much as 36%), there will be no remedy for manufacturers for an energy efficiency standard that was adopted based upon that "provisional," "revisable," "subject to change" and, it turns out, erroneous analysis. While the SCC may be revisable, DOE has taken the position that its energy efficiency standards are not. In fact, DOE cites uncertainties in estimating employment impacts in later years as basis for restricting its analysis to short term impacts (through 2023), yet relies on the SCC, which DOE admits is riddled with uncertainty, past the year 2100.[10] For this reason alone, the use of the SCC in an energy efficiency standard cost benefit analysis under EPCA is entirely unfair and impermissible.

d. The Use of Monetized SCC as Determined on a Global Basis for the World Population is Outside of DOE's Regulatory Authority Under EPCA.

EPCA's focus is exclusively on benefits accruing within this nation. It is not an international statute

[6] 80 Fed. Reg. at 6,184.
[7] 80 Fed. Reg. at 6,210.
[8] 80 Fed. Reg. at 6,209.

[9] 80 Fed. Reg. at 6,221.
[10] 80 Fed. Reg. at 6,211.

and it is not an environmental statute.[11] EPCA authorizes DOE to conduct a national analysis of energy savings. There are no references to global environmental impacts in the statute. Hence, it is unlawful for DOE to rely on SCC figures at the global level. Global analysis is entirely foreign to EPCA Section 6313(a)(6)(B)(ii); *see especially id.* § 6313(a)(6)(B)(ii)(VI) (referencing weighing of "the need for ***national*** energy conservation") (emphasis added). Note as well that EPCA originally arose out of the 1970s oil embargo and nothing in its subsequent amendments suggests a different statutory focus other than trying to improve the energy economics of the United States. To try to reframe EPCA into a globally oriented statute is to ignore that legislative history and evolution.

DOE specifically asserts that it had environmental rulemaking power in the NOPR. 80 Fed. Reg. at 6,191 ("DOE reports the emissions impacts from the proposed standards, and from each TSL it considered, in section IV.K of this notice.") This statement is located under section D.1.f., "Need for *National Energy* Conservation" (emphasis added). In so doing, and by relying on global values, DOE has inserted environmental factors to such an extent that it is no longer determining energy efficiency "based solely on the energy consumed at the point of use"[12] as required by EPCA. By relying on this factor in the cost-benefit analysis, which Congress did not intend DOE to consider, DOE acted arbitrarily and capriciously under the APA. DOE might attempt to argue that environmental factors can be considered in light of Section 6295(o)(2)(B)(i)(VII) ("other factors the Secretary considers relevant"), but in this rulemaking DOE specifically disclaimed any such argument by stating that it "DOE did not consider other factors for this notice." 80 Fed. Reg. at 6,191.

Furthermore, even if inclusion of environmental factors as additional factors is authorized, DOE should not be able to analyze ***global benefits*** but look only to ***national costs***. DOE's analysis contains a fundamental mismatch. The SCC is measured not just for consumers of products purchased in U.S. markets, but in reality across the entire global population, yet DOE's analysis of costs to consumers counts as consumers only those who make purchases of the covered products in the domestic market. DOE implicitly acknowledges this by repeatedly noting that two issues that should be considered:

> First, the national operating cost savings are domestic U.S. consumer monetary savings that occur as a result of market transactions, while the value of CO_2 reductions is based on a global value. Second, the assessments of operating cost savings and the SCC are performed with different methods that use different timeframes for analysis. [2018-2047 for costs, "well beyond 2100" for SCC benefits].

80 Fed. Reg. 6222, 6225. In making this statement, DOE also notes that "adding the value of consumer savings to the values of emission reductions provides a valuable perspective." But it is much more than that. It is used as an additional, separate factor that dominates what is clearly EPCA's focus on national costs and energy savings. For example, on page 6,184 of the NOPR DOE summarizes "national economic benefits in costs" in Table I.3 – yet it includes CO_2 reduction, which is clearly measured on a global scale. The SCC analysis is the key driver of DOE's economic justification, and it is irreparable when it is used to set standards above ASHRAE 90.1 and later turns out to be wrong. As such, it is not a basis for clear and convincing evidence under EPCA.

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[11] Compare DOE's list of SCC damages (net agricultural productivity, human health, increased flood risk) at 80 Fed. Reg. 6,209 to EPCA's list of factors the Secretary must consider (economic impact on manufacturers and consumers of the product, operating cost savings, direct energy savings, lessening of competition or utility, need for energy conservation) at 42 U.S.C. §6313(a)(6)(B)(ii).

[12] 76 Fed. Reg. 51,281, 51,282 ("the Energy Policy and Conservation Act (EPCA) . . . requires that such measures be based solely on the energy consumed at the point of use."

Even assuming DOE had the authority to turn EPCA into an environmental statute, there is also no reason why America's contribution to climate change cannot be based on an analysis that compares costs to benefits on an apples-to-apples basis (*i.e.*, nationally). In fact, as noted above, DOE states explicitly that the interagency group that developed SCC determined that a range of discount rates should be used to calculate domestic effects.[13] DOE's departure from the statutory mandate in light of that ability is arbitrary and entirely without basis.

e. DOE Fails to Meet the Clear and Convincing Standard by Analyzing Benefits Over a Time Period that Exceeds Three Times the Period for Which it Measures Costs.

Although DOE bases its manufacturer impact analysis ("MIA") and INPV analysis on a 30-year period, it notes that the benefits from SCC extend beyond the year 2100.[14] In the NOPR, DOE also argues that costs and benefits include benefits to customers which accrue after 2048 from equipment purchased in 2019-2048, *see* 80 Fed. Reg. at 6,184 n.4, and accounts for incremental variable and fixed costs incurred by manufacturers due to amended standards, some of which may be incurred in preparation for the rule. What benefits can possibly accrue to customers for equipment that is no longer expected to be in use and does not account for the additional costs of purchasing and installing new equipment? While it makes sense to include the R&D and other costs manufacturers will incur in order to comply with the amended standards, DOE provides no justification for the exclusion of any costs that manufacturers might incur after 2048, in measured harmony with the manner and time period that DOE uses to measure the benefits. These time frames for measuring the benefits of the proposed standard are so imbalanced that DOE's entire cost benefit analysis is unreliable.

f. DOE wrongly assumes that SCC values will increase over time.

This is contrary to historical experience and to economic development science. The more economic development that occurs, the more adaptation and mitigation efforts are both undertaken by humanity and that a population living in a growing economy can afford to undertake. Adaptation and mitigation analysis is well known in climate science circles and we see no indication in this rulemaking that DOE paid any separate mind to this issue. *See, e.g.*, IPCC, *Supplementary material to Chapter 18: Inter-relationships between adaptation and mitigation*, Climate Change 2007: Impacts, Adaptation and Vulnerability, *available at* https://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter18sm.pdf. Adaptation/mitigation is treated in the Interagency Working Group analysis but one of the three models used does "propagate forward" damage, though the other two do not. *Compare* Interagency Working Group on SCC, *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866* at 5-6 (Feb. 2010), *available at* http://www.whitehouse.gov/sites/default/files/omb/inforeg/for-agencies/Social-Cost-of-Carbon-for-RIA.pdf *with id.* at 7 (indicating that developed countries can eliminate 90% of the economic impacts of climate change and that developing countries can eventually eliminate 50% of the economic impacts of climate change).

[13] 80 Fed. Reg. at 6,210.

[14] Nothing in DOE's *Statement of Policy for Adopting Full-Fuel-Cycle Analyses Into Energy Conservation Standards Program* is to the contrary. That policy statement clearly states that full-fuel-cycle impacts will start with the compliance date and be measured over the standard NIA period of 30 years. *See* 75 Fed. Reg. 51,423, 51, 425; *also* 75 Fed. Reg. 51,281.

g. DOE's use of SCC violates EPCA Section 6313(a)(6)(A)(ii)(II) and Section 6313(a)(6)(B)(ii)(I)-(VII) by Giving Emissions Savings Disproportionate Weight.

EPCA requires that DOE consider seven different factors in determining whether the benefits of a proposed standard exceed its burdens. There is no indication in the statute or otherwise that Congress intended this to be anything other than a roughly equal weighting of factors where no particular factor is king over all the others. Yet through DOE's inclusion of energy efficiency savings tied to global indirect emissions and SCC reductions that are provisional, revisable, imperfect, and incomplete, and that extend well beyond the life of the equipment and even the relevant period for measuring benefits relative to costs, it has formulated an amount of energy savings that is unsupportable and insurmountable for those who would question the rule. This is true even if all of the other factors point in the direction of significant or even extreme burdens to customers and manufacturers. This is not the kind of balancing of factors that Congress envisioned, and nothing in Executive Order No. 12866 is to the contrary — costs and benefits of intended regulation must be considered *to the extent permitted by the law* — which in this case is the statutory seven-factor analysis in which no one factor is given weight over the others.

h. DOE's SCC Analysis Fails the Information Quality Act's Standards of Decision Making Based on Sound Science and as such is not Clear and Convincing Evidence.

The Information Quality Act (IQA)[15] is contained in the Treasury and General Government Appropriations Act for FY 2001. The IQA provides in relevant part that the Office of Management and Budget (OMB) and the federal agencies must establish guidelines "for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies." IQA Section (a) & (b)(2)(A). There are several areas in which the interagency process used to develop SCC did not comply with the mandates of the IQA.

First, the interagency process was not transparent. The agencies involved were disclosed but not which of their personnel participated, or whether outside consultants were used. This violates the OMB guidelines. Second, the SCC estimates were not subjected to peer review. As noted above, DOE states in the NOPR that the National Resource Council (part of the National Academies of Science) criticized the models the interagency process used as "suffer[ing] from uncertainty, speculation, and lack of information about (1) future emissions of GHGs; (2) the effects of past and future emissions on the climate system, (3) the impact of changes in climate on the physical and biological environment, and (4) the translation of these environmental impacts into economic damages." 80 Fed. Reg. at 6209. Third, in order to translate certain predicted climate-change effects into economic damages, the interagency SCC analysis relies on arbitrary damages functions. As such, the SCC analysis fails the clear and convincing standard in yet another way.

22. Impacts on small business manufacturers from the proposed standard. In particular, DOE seeks further information and data regarding the sales volume and annual revenues for small businesses so the agency can be better informed concerning the potential impacts to small business manufacturers of the proposed energy conservation standards, and would consider any such additional information when formulating and selecting TSLs for the final rule and whether any feasible compliance flexibilities that the agency may consider.

No comment.

[15] Pub. L. 106-554, § 515, 114 Stat. 2763 (Dec. 21, 2000). The IQA is also set out at 44 U.S.C. § 3516.

There are several additional issues on which we have comments.

DOE's Statutory Obligations under EPCA's Commercial Provisions

DOE states that any new or amended standard for CWAF "shall be designed to achieve the maximum improvement in energy efficiency that is technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)(II)" 80 Fed. Reg. 6,183. However, both this statement and citation are in error. First, 42 U.S.C. 6313(a)(6)(A(ii)(II) actually states that to exceed an amended ASHRAE 90.1 standard, the Secretary must show by "clear and convincing evidence, that adoption of a uniform national standard more stringent than the amended ASHRAE/IES Standard 90.1 for the product would result in significant additional conservation of energy and is technologically feasible and economically justified." Second, the language cited regarding maximum improvement in energy efficiency that is technologically feasible and economically justified is from the consumer products provisions of EPCA, (42 U.S.C. § 6295(o)), and that language is explicitly not applicable to commercial warm air furnaces. *See* 42 U.S.C. § 6316(a).

In the CWAF NOPR, DOE is ignoring the important fact that consumer and commercial energy efficiency standard setting proceed very differently, and DOE has a high burden to meet when proposing standards more stringent than ASHRAE 90.1. EPCA explicitly excludes warm air furnaces from the "maximum improvement" language quoted by DOE in the NOPR. (See 42 U.S.C. § 6316(a)("[t]he provisions of . . . subsections (l) through (s) of section 6295 of this title [which, of course, include Section 6295(o)] . . . shall apply with respect to this part (other than the equipment specified in subparagraphs (B), (C), (D), (I), (J), and (K) of section 6311(1) of this title) to the same extent and in the same manner as they apply in part B [*i.e.*, part A-1 as codified] . . . ."); see also 42 U.S.C. § 6311(1)(J) ("warm air furnaces")). Thus, the "maximum improvement" standards applicable to residential equipment plainly do not govern warm air furnaces and other covered industrial equipment.[16] Rather, DOE is expected to adopt ASHRAE standards for commercial products, unless it can meet a Congressionally-mandated heightened burden.

DOE ignores these distinctions and in the process makes serious errors in this proposed rulemaking. First, nowhere does DOE attempt to explain how it reached the conclusion that this proposed rulemaking "would result in significant additional conservation of energy [that] is technologically feasible and economically justified" by *clear and convincing* evidence. 42 U.S.C. § 6313(a)(6)(A)(ii)(II). Instead, DOE's analysis is functionally identical to how it proceeds to set standards under Section 6295(o). It is not enough for DOE to intone that this rulemaking is governed by a higher burden. DOE must instead take the statutory compromise to heart that Congress imposed here. *See, e.g.*, *Am. Hosp. Ass'n v. NLRB*, 899 F.2d 651, 657 (7th Cir. 1990), *aff'd*, 499 U.S. 606 (1991) (cautioning that "Courts must be careful not to . . . upset a legislative compromise" when interpreting a statute, and upholding a NLRB process in part because it comported with legislative intent); *see also Int'l Bhd. of Teamsters v. United States*, 431 U.S. 324, 352-53 (1977) (interpreting Title VII to give effect to the "Mansfield-Dirksen" legislative compromise); *Moore v. Sunbeam Corp.*, 459 F.2d 811, 829-30 (7th Cir. 1972), *opinion modified on denial of reh'g*, (7th Cir. June 27, 1972) (similar). Congress could have given DOE the full panoply of powers it possesses in the residential standard-setting context but it did not do so. Accordingly, DOE's analysis falls far short of this elevated requirement of proof, and DOE has failed to show, clearly and convincingly, that the establishment of standards more stringent than ASHRAE 90.1-2013 should be adopted.

[16] The NOPR includes a significant amount of discussion about the rebuttable presumption for consumer products provided for at 42 U.S.C. §6295(o)(2)(B)(iii), which likewise is entirely inapplicable to CWAF equipment. See e.g. 80 Fed. Reg. at 6,191.

Second, the fact that DOE is wrongly engaged in a Section 6295(o)(2) energy-savings maximization exercise explains why it starts with evaluating TSL 5 and then descends to TSL 4, stopping at that point and doing no comparative analysis of TSLs 1, 2, and 3. *See* 80 Fed. Reg. at 6223 ("DOE considered the impacts of amended standards for CWAF at each TSL, beginning with the maximum technologically feasible level, to determine whether that level was economically justified."). DOE then concludes, after noting that TSL 4 could result in a loss of 58 percent of INPV to manufacturers of covered CWAF, that TSL 4 should be selected. *See* 80 Fed. Reg. at 6,224. But this turns the proper statutory order of consideration on its head. Instead of starting with the max-tech standard level, DOE was obliged by Section 6313(a)(6)(A)(ii) to first consider the ASHRAE standard, *see* subparagraph (II) therein, and consider a higher level only based on clear and convincing evidence. As shown above, DOE did not even purport to apply the "clear and convincing" standard.

DOE May Not Adopt a Final Rule with Energy Conservation Standards It Has Determined in the NOPR are Not Economically Justified.

As demonstrated above, adopting TSL 4 based on a top-down methodology that begins with TSL 5 and moves downward (stopping as soon as possible) is arbitrary and capricious since it represents an approach drawn from residential standard setting that is not applicable in this commercial standards rulemaking. AHRI also believes DOE's view that it may adopt more stringent energy efficiency levels in a final rule, even if in the NOPR DOE determined they are not economically justified, is without merit. *See, e.g.*, 80 Fed. Reg. at 6,186. If based on the LCC, NIA, and GRIM analysis DOE has concluded that a standard level is not economically justified, it cannot change its analysis on such a threshold issue without issuing a supplemental NOPR providing stakeholders the ability to review and comment on any revised analysis reaching a fundamentally different conclusion. Any action otherwise would only compound the legal problems with the rule. It would also violate DOE's Process Rule, in which DOE states that it seeks to provide opportunities for public input early in the rulemaking process, and it would violate 42 U.S.C. 63(a)(6)(B)(ii)(V), as DOE would fail to have an analysis by the Attorney General of the efficiency standard being adopted. Only through a Supplemental Notice of Proposed Rulemaking, and submission to the Attorney General of the new, more stringent standard, could DOE fulfill that statutory mandate.

But perhaps most importantly, adopting efficiency standards that DOE has determined at the NOPR stage to be neither technologically feasible or economically justified would necessarily involve significant additional or revised data and analysis that at this point stakeholders could only guess at, and provides no ability for stakeholder review and comment. DOE could only take such action after issuing a supplemental notice and comment period to allow stakeholders to review, evaluate, and comment on DOE's revised analysis.

DOE Fails to Adequately Consider Cumulative Regulatory Burden in its Cost Benefit Analysis.

In the NOPR, DOE acknowledges the serious consequences for combined effects of recent regulations that impose significant burdens on manufacturers. DOE also noted that in interviews, manufacturers cited such burdens, and listed eleven different relevant standards.[17] However, while DOE stated that it "conducts an analysis of cumulative regulator burden as part of its rulemakings pertaining to appliance efficiency"[18] in the NOPR DOE does nothing more than make that statement and list out the rulemakings manufacturers have identified. There is no discussion of the impacts of the rules, or the analysis DOE allegedly conducted, and no information of how these significant burdens are incorporated into DOE's

[17] 80 Fed. Reg. at 6,217.
[18] *Id.*

cost benefit analysis. Given the extent, timing and costs that will be incurred as a result of these other rules promulgated by DOE, (for example the CUAC rule will impose an additional 24% loss of INPV on manufacturers), the failure to provide its analysis at all is unreasonable. Listing the cumulative regulations in the absence of any analysis also fails to meet the requirements of Executive Orders 12866 and 13563 because it is not a real "accounting" of the costs of cumulative regulations. AHRI and other stakeholders cannot comment on DOE's analysis of this important issue if DOE does not present it. DOE must issue a SNOPR providing this opportunity on this issue and the others identified above.

ASRAC Working Group on Commercial Packaged Air Conditioning (CUAC) and CWAF

AHRI believes that the best approach to resolve the issues identified above, as well as the concerns of other stakeholders on this rulemaking and on the CUAC rulemaking, is a negotiated rulemaking at which stakeholders can work together to develop standards that will result in energy savings using technology that is feasible and economically justified. For this reason AHRI fully supports DOE's ASRAC Committee's decision to open a joint CUAC/CWAF negotiated rulemaking working group.[19] AHRI looks forward to participation on that working group. Through AHRI's past participation in similar working groups, we have found that participants develop a better understanding of each stakeholder's concerns, as well as a better understanding regarding the technical analysis underlying DOE's initial determinations. AHRI is confident that the working group will develop a record that will provide a robust and substantive discussion of DOE's analysis and stakeholder's concerns. All of that work will inform and must be made part of the record of both the CUAC and CWAF rulemakings. While AHRI is hopeful that the negotiated rulemaking be successful, and will do everything it can to support a negotiated solution, we also recognize that this joint rulemaking involves complicated issues on a very tight timeframe. Should the working group be unable to reach consensus, that record must be incorporated into both CWAF and CUAC rulemaking, and the comment period on both rules should be reopened so that all stakeholders will have an opportunity to comment upon new information and analysis, and benefit from the discussions, determinations, and analysis of the working group.

We appreciate this opportunity to provide comments and participate in this rulemaking.

Respectfully submitted,

Frank A. Stanonik

Frank A. Stanonik
Chief Technical Advisor

Attachment

[19] 80 Fed. Reg. 17,363 (April 1, 2015).

Condensate Dwell Graph