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Ms. Abigail Daken
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United States Environmental Protection Agency
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Submitted via e-mail: cacashp@energystar.gov

Re: EPA ENERGY STAR Residential Air Source Heat Pump (ASHP) and Central Air Conditioner (CAC) Equipment Version 6.0 Discussion Guide.

Lennox International Inc. (Lennox) hereby submits comments on the *United States Environmental Protection Agency (EPA) ENERGY STAR Residential Air Source Heat Pump (ASHP) and Central Air Conditioner (CAC) Equipment Version 6.0 Discussion Guide*; as published by the EPA on August 3, 2018.

Lennox is a leading provider of climate-control solutions for heating, air conditioning, and refrigeration markets. Lennox is a publicly-traded company that has thousands of employees, and it manufactures equipment addressed by the EPA ENERGY STAR ASHP and CAC program criteria. Lennox appreciates the opportunity to work with EPA to develop reasonable, practical energy efficiency specifications and programs that further EPA's energy efficiency objectives.

Lennox offers the following general comments regarding the ASHP and CAC Version 6.0 Discussion Draft followed by specific issues for which the EPA is seeking comment.

A. General Comments.

Lennox believes there is significant benefit to the EPA ENERGY STAR program as a forum that can be used by stakeholders to promote increased energy efficiency. This is accomplished by setting reasonable specifications for energy performance criteria that also consider impacts to consumers, contractors, distributors and manufacturer's.

Lennox offers some of the most efficient ASHP and CAC products on the market and supports the EPA ENERGY STAR efforts to recognize and promote highly efficient products. Lennox strongly recommends the EPA base the primary criteria for the ENERGY STAR ASHP and CAC programs on the federally mandated energy efficiency metrics (SEER, EER and HSPF) for these products and avoid additional prescriptive requirement which can limit potential future innovation. While Lennox understands that in certain situations prescriptive requirements may be necessary in effort to drive specific functionality, Lennox finds prescriptive standards which chose technologies rather than relying on performance metrics to drive product innovation to the most effective solution to be counterproductive.

Lennox further recommends coordination of the Residential ASHP and CAC Equipment Version 6.0 criteria with the Consortium for Energy Efficiency (CEE). CEE is the leading consortium of efficiency program administrators across the United States and Canada. CEE members work to unify energy program approaches across jurisdictions to increase the success of efficiency programs. Lennox finds that having one set of specifications that can be promoted by all efficiency programs in the US and Canada make it easier for contractors, distributors, and manufacturers to engage and hence allows for a larger impact on the market for enhanced energy efficient products.

Lennox wishes to better understand the implementation timing of the 6.0 revision as a key consideration of our position and may alter the positions outlined below relative to the intended timing. Lennox strongly recommends that the ENERGY STAR program maintain the current performance tier levels through January 1, 2023, when updated DOE ASHP and CAC minimum performance standards go into effect. While consideration of the ENERGY STAR Most Efficiency may require an update before 2023 other levels should remain at the current levels. Lennox is available to further engage with the EPA to inform and discuss opportunities to advance the Version 6.0 update toward the EPA objectives. Further comment supporting this and other issues the EPA has raised in the notice are detailed in the following.

B. Specific Issues regarding the Proposed Criteria.

Variable Capacity

Lennox offers a variety of variable capacity ASHP and CAC products including 2 stage and fully variable products. While Lennox supports the EPA ENERGY STAR efforts to recognize and promote highly efficient products we recommend the EPA base the primary criteria for the ENERGY STAR ASHP and CAC programs on the federally mandated energy efficiency metrics for these products and avoid additional prescriptive requirement which can limit potential future innovation. While Lennox can support the current ENERGY STAR requirement of a minimum of 2 stages of capacity for its Most Efficient program we strongly recommend not adding this or other similar prescriptive requirements to other ENERGY STAR levels. Lennox finds prescriptive requirements to be limiting of future innovation opportunities.

Regionally-Specific Performance Requirements

Lennox strongly recommends that the EPA refrain from Regional Specific Performance Requirements into the ENERGY STAR program for ASHP and CAC products. Lennox finds that having one set of specifications that can be promoted by all efficiency programs in the US and Canada makes it easier for contractors, distributors, and manufacturers to engage and hence allows for a larger impact on the market for enhanced energy efficient products. Regional requirements further slice the market into smaller segments and may limit participation in the program as it may necessitate regional specific product designs which individual manufacturers may not choose to participate in. This segmentation also reduces competition and has negative market impacts for higher efficiency products due to limited consumer choice and higher product cost.

Optional Connected/Grid-aware Criteria

Lennox supports the EPA exploring the inclusion of connected grid-aware criteria for Residential Air Source Heat Pump and Central Air Conditioner systems and would like to further explore the proper avenue to recognize and promote smart connected systems with the EPA. Further, Lennox supports AHRI 1380 standard for grid responsive systems (DR) and encourages the EPA to expand its current ENERGY STAR Communicating Thermostat Specification to recognize products that provide this capability beyond typical set-back DR approaches.

Lennox agrees that the EER requirements in the current ENERGY STAR specification are important to limit peak demand in areas where utilities face capacity constraints. While systems with DR can be helpful to manage peak load issues, widespread population of these products and utility programs that utilize this capability along with consumer acceptance is required to provide adequate peak load control capability. Lennox recommends that given the sparse current availability of DR ready products in the near term, an EER backstop is necessary to insure peak demand is managed.

Energy Efficiency Metrics

Lennox supports the EPA plan to use SEER, EER, and HSPF for Version 6. But Lennox also finds value to understand where any revisions to the EPA performance tiers would fall under the new metrics (SEER2, EER2, and HSPF2) that DOE requires for representations after January 1, 2023. Lennox wishes to better understand the implementation timing of this revision before dismissing the potential of establishing parallel requirements for the new metrics. As the EPA ENERGY STAR and CEE tier levels typically become defacto design specifications, it is preferred to understand the EPA perspective on performance levels under the new requirements in advance of the 2023 standards as this provides the opportunity to optimize the product design to aid in market acceptance.

Further Specific Issues Raised in the EPA Notice.

1. Is EER used to predict seasonal efficiency anywhere outside the U.S. Southwest region?

EER is not a seasonal efficiency metric. EER is efficiency metric at a single test condition related to relative peak load conditions and is not indicative of seasonal performance where temperature conditions vary for any U.S. region. Lennox recommends the EPA continue to establish national specifications for the ENERGY STAR program and avoid regional requirements which will further segment the market and negatively impact efforts to promote high efficiency ASHP and CAC systems.

2. How widespread is the need to control peak load by incentivizing high EER systems?

Lennox finds that controlling peak load to be a national issue, particularly for areas with high population densities. While some provision that credit systems with demand response capability

may be warranted to further recognize and promote those systems, widespread population of these products and utility programs that utilize this capability along with consumer acceptance is required to provide adequate peak load control capability. Given the sparse current availability of DR ready systems in the near term, an EER backstop is necessary to insure peak demand is managed.

3. Are there other opportunities a regional specification would present?

Lennox recommends the EPA continue to establish national specifications for the ENERGY STAR program and avoid regional requirements which will further segment the market and negatively impact efforts to promote high efficiency ASHP and CAC systems. Lennox finds that having one set of specifications that can be promoted by all efficiency programs in the US and Canada make it easier for contractors, distributors, and manufacturers to engage and hence allows for a larger impact on the market for enhanced energy efficient products.

4. EPA is aware of ongoing efforts to define northern climate heat pump performance and establish a test method, for instance the Northwest Energy Efficiency Alliance (NEEA) effort and work that the Canadian Standards Association (CSA) is doing with a Canadian utility. What are the relative advantages and disadvantages of those efforts, for instance repeatability, testing burden, and capturing real world effects? Should other methods of establishing this performance be considered?

Lennox strongly recommends the EPA base the criteria for the ENERGY STAR ASHP and CAC programs on the federally mandated energy efficiency metrics (SEER, EER and HSPF) and the federal test procedures prescribed for these metrics. Over the last 10 years the industry has been faced with an unprecedented rate of change in regard to federal and state regulations and is currently faced with upcoming standard changes for ASHP and CAC products and Commercial CAC in 2023 which will force a redesign of our product portfolio. This is compounded by the fact that states such as California, New York and others are intending to implement regulations which will require all new products in 2023 to employ low GWP refrigerants forcing manufacturers to design, develop and test products with both the currently used refrigerant (R410A) and a new low GWP refrigerant. The available resources within the industry including test facilities will be completely consumed with the task of developing products to meet these regulatory requirements through 2023 and beyond.

Further, while the CSA effort is well intended, there has not been a clear demonstration that representations of performance in accordance with this procedure will improve correlation to energy use in application. Much as the current relationship of the current test procedure and resulting metrics are subject to variation in the building envelope and installation to determine actual energy use, this CSA test procedure and result are likely to be subject to these same issues. In addition the cost to industry not been determined to change test facilities or conduct these test. Prior to consideration of this test procedure, even for voluntary programs, this cost benefit analysis needs to be completed in addition to work related to the accuracy and repeatability of

the test. But given the current regulatory situation, the reality is that that even if all these elements were in place and the results were positive, there is no capacity within the industry to conduct testing regimes other than the DOE requirements for the foreseeable future.

5. Would it be reasonable for products with DR capability to have lower EER requirement (aside from where needed for seasonal energy) than those without?

Lennox is in agreement that it is reasonable for products with DR capability to have lower EER requirements. But conversely just because a product has DR capability does not insure that the utility where the product is installed will offer a DR program for these products or that the consumer will subscribe in the program. Lennox recommends that EPA recognize and promote systems with these capabilities appropriately as a first step and further evaluate system threshold criteria for potential relaxation of EER requirements.

6. Are there any problems with relying on AHRI 1380 for demand responsiveness criteria?

Lennox supports AHRI 1380 as the criteria for DR capability. The standard will certainly evolve as more experience is gained and this area develops further but the standard as proposed provides a robust portfolio of DR capability which should benefit all stakeholders.

7. What value does connectivity bring to CAC/ASHP customers (aside from grid value)?

Lennox finds grid connectivity to open a portfolio of customers energy saving, comfort and convenience features and benefits including those listed below and others being considered.

- Product installation and commissioning applications
- Installation reports
- Smart program scheduling
- Smart away geo-fencing
- System performance optimization including humidity and airflow control
- Enhanced zone control
- Performance monitoring and reporting
- Smart Service alerts
- Voice control
- Home automation/energy integration
- Remote monitoring, remote debug and diagnostic option with homeowner consent

8. How would one consider connectivity for products intended to work with a proprietary controller that is not part of the unit itself, but instead takes the place of a thermostat?

Proprietary control systems will likely be necessary for any fully variable capacity product and the controls required to provide connectivity and or DR capability should be allowed and reside

anywhere in the system. This could include within the ASHP/CAC outdoor unit, indoor unit, thermostat or remotely located controls. The critical aspect is to identify all required components of the complete system to receive recognition.

9. Would it be possible to establish parallel SEER2, EER2, and HSPF2 criteria?

Yes it is possible to establish parallel criteria for the new DOE metrics of SEER2, EER2 and HSPF2. Just as DOE created a math based crosswalk from the current DOE Appendix M test procedure to the new Appendix M1 test procedure for the DOE 2023 efficiency standards for these products, crosswalks can be developed for the current or newly proposed ENERGY STAR performance tier levels. While there are some further considerations for variable speed products the primary drivers for the crosswalk are the differences in fan power due to the increase in static pressure in the new M1 test procedure as well as changes to the heating load line for ASHP's. SEER, EER and HSPF levels can be calculated from these differences to establish equivalent levels under the new metrics.

10. If so, would any manufacturers be interested in using this option?

Lennox supports the EPA plan to use SEER, EER, and HSPF for Version 6.0. Lennox also finds value to understand where any revisions to the EPA performance tiers would fall under the new metrics (SEER2, EER2, and HSPF2) that DOE requires for representations after January 1, 2023. Lennox wishes to better understand the implementation timing of this revision before dismissing the potential of establishing parallel requirements for the new metrics. As the EPA ENERGY STAR and CEE tier levels typically become defacto design specifications, it is preferred to understand the EPA perspective on performance levels under the new requirements in advance as this provides the opportunity to optimize the product design to aid in consumer market acceptance.

In conclusion, Lennox appreciates the opportunity to provide these comments and looks forward to further direct engagement with the EPA as ENERGY STAR Version 6.0 develops. Please feel free to contact us with any further questions.

Sincerely,



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