Northwest Energy Efficiency Alliance
Appliance Standards Awareness Project
Natural Resources Defense Council

November 9th, 2020
Via Electronic Mail

Ms. Catherine Rivest and Mr. Antonio Bouza
U.S. Department of Energy
Appliance and Equipment Standards Program
Building Technologies Office
EE-5B, 1000 Independence Avenue SW
Washington, DC 20585-0121

Re: Docket Number EERE–2020–BT–STD–0008: Energy Conservation Program: Energy Conservation Standards for Computer Room Air Conditioners and Air-Cooled, Three-Phase, Small Commercial Package Air Conditioning and Heating Equipment with a Cooling Capacity of Less Than 65,000 Btu/h

Dear Ms. Rivest and Mr. Bouza,

Northwest Energy Efficiency Alliance (NEEA), Appliance Standards Awareness Project (ASAP), and Natural Resources Defense Council (NRDC) submit the following comments in response to the Department of Energy's (DOE) notice of data availability and request for information (NODA/RFI) on the analysis of energy savings potential from the adoption of updated standards for computer room air conditioners (CRACs) and three-phased, air-cooled package air-conditioning and heating equipment with a cooling capacity less than 65,000 Btu/h (small three-phase package AC and HPs). DOE published this NODA/RFI in response to amended standards levels in ASHRAE Standard 90.1-2019 for certain product classes of CRACs and small three-phase package AC and HPs. DOE is also considering updated standards for product classes which have not been amended in ASHRAE 90.1-2019 per the Energy Policy and Conservation Act's (EPCA's) six-year review requirement. 85FR60642 (September 25, 2020).

Comments

We appreciate DOE's consideration of updated standards for both CRACs and small three-phase package ACs and HPs undertaken in this rulemaking. As noted in the NODA/RFI, DOE has determined that the amended standards levels for CRACs and small three-phase package AC and HPs in ASHRAE Standard 90.1-2019 are equivalent to or more stringent than the current federal standards (with the exception of space constrained and small ducted high velocity small

three-phase package AC and HPs for which there are currently no products on the market). [1] While we agree with this conclusion, we disagree with DOE's conclusion that the change in energy efficiency metrics results in too much uncertainty for DOE to determine whether more stringent standards than the ASHRAE 90.1-2019 levels are warranted.[2] Further analysis of potential energy savings beyond ASHRAE 90.1-2019 levels should be conducted to assess whether more stringent standards are technologically feasible and economically justified. We offer the following specific comments on the NODA/RFI.

We agree with DOE's crosswalk methodology and support DOE's conclusion that ASHRAE Standard 90.1-2019 energy efficiency levels generally increase efficiency compared to current DOE federal standards levels.

DOE's current energy efficiency standards use the Sensible Coefficient of Performance (SCOP) metric which is based on the ASHRAE Standard 127-2007 test method, whereas the ASHRAE 90.1-2019 standard uses the Net Sensible Coefficient of Performance (NSenCOP) metric based on the AHRI Standard 1360-2017 test method. As summarized in NODA/RFI Table II-3, the key differences in the rating conditions under these two test methods are return air temperature, entering water temperature, external static pressure (ESP), and accounting for heat rejection fan and pump power.[3]

DOE has developed a crosswalk to compare the current DOE standards (in SCOP) to the ASHRAE 90.1-2019 standards (in NSenCOP). We find DOE's crosswalk methodology reasonable. The key differences in rating conditions for NSenCOP – increased return air temperature, reduced entering water temperature, reduced ESP, and a heat rejection adder – will all tend to increase NSenCOP values as compared to SCOP values, as DOE has found. We also agree with DOE's conclusion that the ASHRAE 90.1-2019 levels generally increase efficiency when compared to the current levels, except for space constrained and small duct, high velocity small three-phase package AC and HPs.

We also support DOE's conclusion that unit energy consumption (UEC) values for the ASHRAE 90.1-2019 levels can be calculated based on the ratio of the baseline NSenCOP level and the ASHRAE 90.1-2019 NSenCOP level. Given the nature of the rating condition differences[4] between AHRI 1360-2017 and ASHRAE 127-2007 this methodology is reasonable for determining the average change in annual energy use from the UECs determined in the May 2012 final rule[5].

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[1] 85 Fed. Reg. 60658-60660; 60662 (September 25, 2020)
[2] 85. Fed. Reg. 60673 (September 25,2020)
[3] 85. Fed. Reg. 60654 (September 25, 2020)
[4] E.g. both metrics are full load ratings at a single test condition.
[5]https://www.regulations.gov/document?D=EERE-2011-BT-STD-0029-0038

We encourage DOE to evaluate efficiency levels beyond ASHRAE Standard 90.1-2019.

DOE states in the NODA/RFI that it has tentatively determined that more stringent standards for CRACs and small three-phase package AC and HPs do not meet the threshold required for adopting amended standards more stringent than the ASHRAE 90.1-2019 levels because the estimated energy savings are uncertain due to the change in metrics and associated energy savings methodology.[6] We disagree that this is a foregone conclusion; additional analysis of higher standard levels is warranted. DOE must conduct an analysis to determine the potential energy savings and then evaluate these energy savings and the associated range of uncertainty against EPCA's requirements for the adoption of standards more stringent than the ASHRAE levels.

First, as discussed above, the crosswalk methodology developed by DOE is reasonable and likely to lead to representative accounting of potential energy savings. This crosswalk methodology has already been vetted by stakeholders during the September 2019 NODA/RFI considering adopting the ASHRAE 90.1-2016 standards, where it was supported by both manufacturers and utilities.[7]

Second, energy savings from increased efficiency levels beyond the ASHRAE 90.1-2019 levels have the potential to be significant, given the annual energy consumption of CRAC units and the range of available efficiencies. As stated in the NODA/RFI, the annual energy use of CRACs meeting the current federal minimum standards ranges from roughly 15,000 kWh/year to over 310,000 kWh/year, depending on the unit type and capacity.[8] Based on a review of models available in DOE's Compliance Certification Database, many product classes have a wide range of available efficiencies.

Figure 1 below illustrates the model counts by efficiency for air-cooled, downflow CRACs under 65,000 Btu/h. For this product class, the most efficient unit available is 45% more efficient than the baseline. In the September 2019 NODA/RFI, DOE analyzed potential energy savings for five of the over 50 product classes of CRACs and similarly found a range of efficiencies available, with the max-tech levels analyzed were 12 to 27% higher when compared to the ASHRAE 90.1-2019 levels.[9] While those five classes analyzed represent a small portion of the overall market, savings from increased efficiency standards have the potential to be significant across all product classes. The range of available efficiency levels combined with the high UEC for CRAC units indicates the potential for significant energy savings from higher standard levels than those in ASHRAE 90.1-2019.

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[6] 85. Fed. Reg. 60663 (September 25, 2020)
[7] 85. Fed. Reg. 60660 (September 25, 2020)
[8] 85. Fed. Reg 60665-6 (September 25, 2020)
[9] 2019 NODA Technical Support Document Tables 4.18 and 4.19

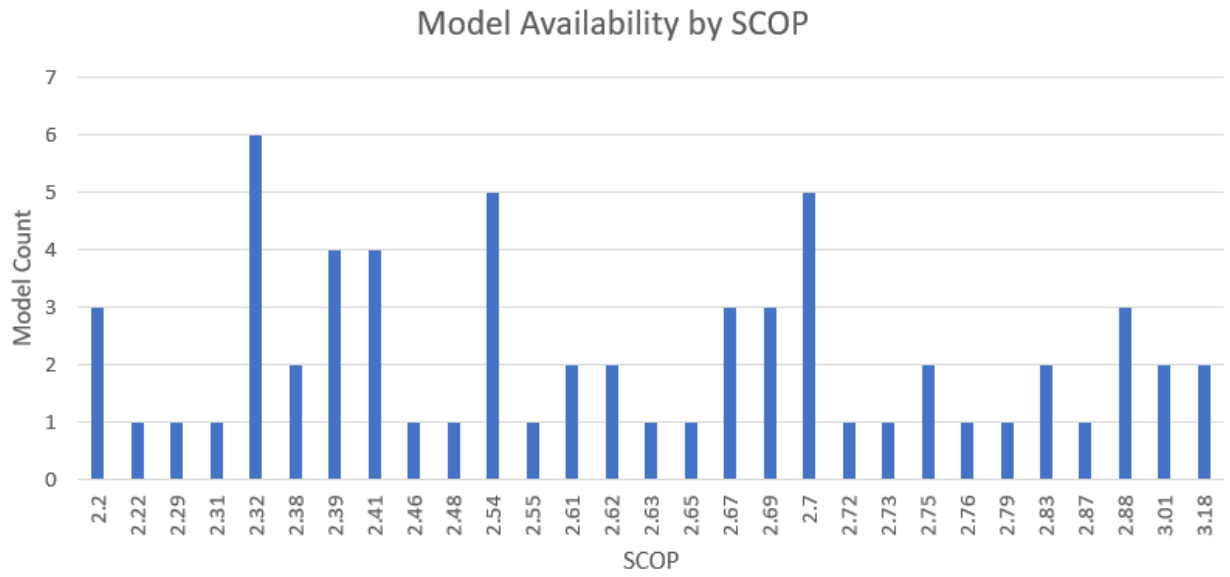

Figure 1: Count of model numbers by SCOP of available models in DOE's Compliance Certification Database for air-cooled, downflow CRACs under 65,000 Btu/h.[10]

Finally, it is not unprecedented for DOE to adopt amended standards at levels higher than the ASHRAE 90.1 levels based on a revised metric. In the 2014 Notice of Proposed Rulemaking (NOPR) for small, large, and very large commercial unitary air conditioning and heating equipment, DOE proposed standards at levels that were more stringent than the ASHRAE levels based on a new metric (IEER, integrated energy efficiency ratio).[11] Ultimately, more stringent IEER levels than the ASHRAE levels were adopted in the 2016 direct final rule.[12]

We urge DOE to analyze standards for equipment classes to meet EPCA's six-year review mandate.

DOE has indicated that it is considering reviewing standards for equipment classes that have not been updated by ASHRAE as part of this rulemaking in accordance with EPCA's six-year review provision. We support reviewing the standards for these equipment classes, but DOE has failed to conduct that review as part of this NODA/RFI. DOE must conduct an analysis for these equipment classes to determine whether more stringent standards are technologically

[10] https://www.regulations.doe.gov/certification-data/CCMS-4-Air_Conditioners_and_Heat_Pumps_-_Computer_Room_Air_Conditioners.html#q=Product_Group_s%3A%22Air%20Conditioners%20and%20Heat%20Pumps%20-%20Computer%20Room%20Air%20Conditioners%22

[11] https://www.regulations.gov/document?D=EERE-2013-BT-STD-0007-0030

[12] https://www.regulations.gov/document?D=EERE-2013-BT-STD-0007-0113

feasible and economically justified. DOE argues that the same uncertainties due to the change in metric apply to these equipment classes as for the equipment classes for which ASHRAE has amended the standard levels.[13] As discussed above, DOE has developed a methodology to account for the change in metric that has been vetted by stakeholders during the 2019 NODA/RFI process. DOE must conduct an analysis for the products subject to the six-year review provision and weigh the potential energy savings against any potential uncertainty.

We recommend that DOE conduct a test procedure rulemaking to capture energy savings opportunities not accounted for in the current test procedure.

Significant energy savings are likely achievable using the current test procedure and full load metric, and DOE should consider efficiency levels beyond the ASHRAE levels in this rulemaking as described above, using the NSenCOP metric. Additional energy savings are achievable in CRACs through technologies not currently captured by either the SCOP or NSenCOP metrics. As described in joint comments submitted to the 2017 Test Procedure RFI, we recommend that DOE update the test procedure for CRACs in a future rulemaking to account for part-load performance.[14] As described in those comments, DOE has estimated that CRACs operate at an average of 65% of full load capacity. Existing technologies can reduce part-load energy use, such as variable speed controls, which have been shown to reduce energy use in CRACs by 22-32%.[15] DOE should conduct a future rulemaking to address this issue and other test procedure issues previously described in the joint advocate comments.[16]

Summary

In summary, we support DOE's crosswalk methodology and overall assessment that the ASHRAE 90.1-2019 standard levels are generally more stringent than the current DOE standards. We recommend that DOE:

1) Conduct an analysis of the potential energy savings of more stringent standard levels both for equipment classes that have amended standards in ASHRAE 90.1-2019 and those subject to the six-year review requirement. DOE can then appropriately evaluate these potential energy savings as required by EPCA.
2) Analyze standards for equipment classes to meet EPCA's six-year review mandate.
3) Conduct a future rulemaking to amend the test procedure for CRACs to account for part load performance.

[13] 85 Fed. Reg. 60675 (September 25, 2020)
[14] https://appliance-standards.org/sites/default/files/Comm_AC_Test_procedures_RFI_Comments.pdf
[15] https://energy.gov/sites/prod/files/2013/10/f3/dc_fancasestudy.pdf
[16] https://appliance-standards.org/sites/default/files/Comm_AC_Test_procedures_RFI_Comments.pdf

Thank you for considering our comments.

Sincerely,

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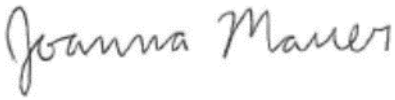

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