

Natural Resources Defense Council  
Appliance Standards Awareness Project  
Alliance to Save Energy  
National Consumer Law Center  
Northwest Energy Efficiency Alliance

September 2, 2015

Ms. Brenda Edwards  
U.S. Department of Energy  
Building Technologies Program  
1000 Independence Avenue, SW  
Mailstop EE-2J  
Washington, DC 20585

**RE: Docket Number EERE–2014–BT–STD– 0059: Request for Information for Energy Conservation Standards for Room Air Conditioners**

Dear Ms. Edwards:

This letter constitutes the comments of the Natural Resources Defense Council (NRDC), Appliance Standards Awareness Project (ASAP), Alliance to Save Energy (ASE), National Consumer Law Center (NCLC), and Northwest Energy Efficiency Alliance (NEEA) on the request for information (RFI) for energy conservation standards for room air conditioners. 80 Fed. Reg. 34843 (June 18, 2015). We appreciate the opportunity to provide input to the Department.

**We support DOE’s plan to consider a metric that captures part-load performance.** In the RFI, DOE states that it intends to investigate the merits and limitations of a metric that captures part-load performance.<sup>1</sup> We believe that a metric that captures part-load performance could result in additional energy savings compared to the current CEER metric. While room air conditioners are often used during peak times (e.g. to provide supplementary air conditioning on the hottest days of the year), they are also often used as a primary air conditioning source, either for an individual room not served by a central system or for an entire house. The 2009 Residential Energy Consumption Survey supports this range of usage patterns: of the 25.9 million housing units that have one or more room air conditioners, 12 million report using the unit(s) “all summer” or “quite a bit,” while 13.9 million report using the unit(s) only a few times when needed.<sup>2</sup> Units that are used frequently would likely benefit from part-load efficiency improvements. Furthermore, room air conditioners are often purchased by homeowners who may not size the units correctly. If room air conditioners are often oversized, units that could better match a room’s load could provide energy savings.

DOE indicates that in evaluating a potential revised metric it plans to examine room air conditioners on the market that incorporate variable speed compressors and other technologies

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<sup>1</sup> 80 Fed. Reg. 34848.

<sup>2</sup> <http://www.eia.gov/consumption/residential/data/2009/index.cfm?view=characteristics>

whose benefits would be captured by a part-load metric.<sup>3</sup> While it makes sense to examine any products on the market with improved part-load performance, given that the current metric does not capture part-load operation, there may be limited products available with part-load features. If the metric were to capture part-load performance, manufacturers would be encouraged to develop products with variable-speed capabilities; the unavailability of these features today should not discourage DOE from considering a test procedure that captures their benefits.

**We encourage DOE to consider amending the test procedure to capture the energy used by “connected” features of room air conditioners.** As DOE notes in the RFI, EPA recently amended the ENERGY STAR criteria for room air conditioners to include a five percent energy credit for units that incorporate “connected” features, including the ability to respond to a demand response signal.<sup>4</sup> While there appear to be only a limited number of room air conditioners on the market today that incorporate connected features,<sup>5</sup> the market penetration of these features is likely to increase with the new ENERGY STAR criteria. We encourage DOE to evaluate the additional energy use of “connected” features and consider amending the test procedure to capture this energy use.

**We strongly support considering alternative refrigerants as a technology option to improve efficiency.** In the RFI, DOE indicates that it will consider alternative refrigerants in its analysis and that specifically it plans to consider R-407C, R-290, R-441A, R-32, and other HFC and HC refrigerants.<sup>6</sup> We agree that DOE should investigate alternative refrigerants as a technology option as there are currently-available alternatives as well as alternatives that are likely to be approved within the timeframe of this rulemaking that may provide improved efficiency. In addition to the refrigerants outlined in the RFI, we encourage DOE to also consider the following refrigerants:

- R-454B (GWP 490, flammability 2L, currently available)
- R-446A (GWP 490, flammability 2L, currently available)
- R-447A (GWP 580, flammability 2L, currently available)
- “DR-55” (GWP 675, flammability 2L, soon to be available)

Alternatives R-454B, R-446A, R-447A, and “DR-55” have all been developed as medium-GWP, more-efficient replacements for R-410A and R-407C. DuPont’s R-454B has been shown to have modest flammability and very good energy efficiency, while their soon-to-be-numbered “DR-55” demonstrates near-design-compatibility with R-410A, very low burning velocity, and better energy efficiency over a wide range of conditions. Honeywell has developed R-446A and R-447A and is currently implementing these refrigerants in Europe and Asia. DuPont expects SNAP approval for “DR-55” for residential applications by the time DOE’s NOPR is due, and the other refrigerants may also see SNAP approval in that timeframe or shortly thereafter.

**DOE should not maintain the 50-pound weight limit for room air conditioners in Product Class 1.** DOE notes in the RFI that for the analysis for the 2011 final rule, DOE limited the total

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<sup>3</sup> 80 Fed. Reg. 34848.

<sup>4</sup> 80 Fed. Reg. 34848.

<sup>5</sup> See example: <http://www.amazon.com/Friedrich-SM15N10B-000-BTU-Conditioner/dp/B00GM303WE>

<sup>6</sup> 80 Fed. Reg. 34849.

weight of the Product Class 1<sup>7</sup> baseline unit to 50 pounds. However, DOE further notes that it did not consider weight limits for the other analyzed product classes because baseline units in those product classes already exceeded 50 pounds.<sup>8</sup> We see no reason to continue to limit the weight of units in Product Class 1 to 50 pounds for the analysis if units in other products classes already exceed this limit.

**DOE should evaluate efficiency levels that capture all technologically feasible design options.** In the RFI, DOE indicates that it plans to define efficiency levels (ELs) above the baseline utilizing available design options and will look to specifications such as ENERGY STAR and CEE when setting ELs.<sup>9</sup> We agree that DOE should consider ENERGY STAR and other specifications when setting ELs. However, we also encourage DOE to evaluate ELs that capture the full range of technologically feasible design options, even if there are not currently-available products that meet these levels. The recent update of the ENERGY STAR specification found that there are many technology options available to increase the efficiency of room air conditioners, but that there are few products available today that meet the updated specification. This product availability is likely to increase in the next couple of years as the specification takes effect, and there may also be further efficiency improvements beyond the ENERGY STAR levels that are technologically feasible.

**DOE should consider ORNL’s work to develop a room air conditioner that achieves 13 EER.** ORNL is conducting a project to develop a “next generation” room air conditioner.<sup>10</sup> As of 2014, ORNL and their partner (GE) had developed a prototype that achieved an efficiency of 13.1 EER by modifying a 10.8 EER unit. The modifications to the base unit included replacing the fan motor with an ECM motor, replacing the compressor with a smaller-capacity compressor, and replacing the R-410A refrigerant with a blend containing a higher percentage of R-32. The results showed that the switch to an ECM fan motor by itself improved EER from 10.8 to 11.5, and that the change of refrigerant increased EER by about 0.3 points.<sup>11</sup> In addition, the researchers noted that using pure R-32 or other emerging refrigerants could further improve efficiency.

Thank you for considering these comments.

Sincerely,



Meg Waltner  
Manager, Building Energy Policy  
Natural Resources Defense Council



Joanna Mauer  
Technical Advocacy Manager  
Appliance Standards Awareness Project

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<sup>7</sup> Without reverse cycle, with louvered sides, and less than 6,000 Btu/h.

<sup>8</sup> 80 Fed. Reg. 34851.

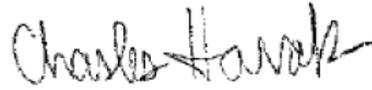
<sup>9</sup> 80 Fed. Reg. 34852.

<sup>10</sup> [http://energy.gov/sites/prod/files/2014/10/f18/emt46\\_bansal\\_042314.pdf](http://energy.gov/sites/prod/files/2014/10/f18/emt46_bansal_042314.pdf).

<sup>11</sup> [http://energy.gov/sites/prod/files/2014/10/f18/emt46\\_bansal\\_042314.pdf](http://energy.gov/sites/prod/files/2014/10/f18/emt46_bansal_042314.pdf), p. 12.



Kateri Callahan  
President  
Alliance to Save Energy



Charles Harak, Esq.  
National Consumer Law Center  
(On behalf of its low-income clients)



Charlie Stephens  
Sr. Energy Codes & Standards Engineer  
Northwest Energy Efficiency Alliance