

Appliance Standards Awareness Project  
American Council for an Energy-Efficient Economy  
Natural Resources Defense Council

September 21, 2018

Antonio Bouza  
U.S. Department of Energy  
Office of Energy Efficiency and Renewable Energy  
Building Technologies Office, EE-5B  
1000 Independence Avenue SW  
Washington, DC 20585

**RE: Docket Number EERE–2017–BT–TP–0029: Request for Information for Test Procedures for Water-Source Heat Pumps**

Dear Mr. Bouza:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), American Council for an Energy-Efficient Economy (ACEEE), and Natural Resources Defense Council (NRDC) on the request for information (RFI) for test procedures for water-source heat pumps (WSHPs). 83 Fed. Reg. 29048 (June 22, 2018). We appreciate the opportunity to provide input to the Department.

**We encourage DOE to expand the scope of the WSHP test procedure to include equipment with cooling capacity greater than or equal to 135,000 Btu/h.** The RFI notes that while the current test procedure applies only to WSHPs with a rated cooling capacity less than 135,000 Btu/h, DOE has identified models on the market with higher cooling capacities.<sup>1</sup> We encourage DOE to expand the scope of the test procedure to cover these larger-capacity models so that there is a standardized test procedure for this larger equipment and consumers of this equipment can have confidence in efficiency ratings provided by manufacturers.

**We encourage DOE to ensure that the test procedure for WSHPs adequately captures fan energy use.** We understand that the current test procedure captures fan operation only when the compressor is running and does not capture fan operation for ventilation or air circulation, for example. DOE also notes in the RFI that the current test procedure does not specify minimum external static pressure requirements for ducted equipment and that fan power used for overcoming external resistance is excluded from the efficiency calculation.<sup>2</sup> These issues suggest that the test procedure may be significantly underestimating fan energy consumption. If fan energy consumption is not being adequately captured in the test procedure, the efficiency ratings for WSHPs are not providing good information to consumers about actual energy use in the field. We encourage DOE to investigate fan operation when the compressor is off and to establish minimum external static pressure requirements for ducted equipment in order to better capture fan energy consumption. We also encourage DOE to

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<sup>1</sup> 83 Fed. Reg. 29050.

<sup>2</sup> 83 Fed. Reg. 29050.

include the fan power used for overcoming external resistance in the efficiency calculations for WSHPs intended to be used with ducting so that the efficiency ratings are more representative of field performance.

**We encourage DOE to consider seasonal efficiency metrics for WSHPs that better reflect annual energy consumption including part-load operation.** As DOE notes in the RFI, the current efficiency metrics for WSHPs do not capture part-load operation. We understand that WSHPs operate most of the time at part load, which means that the current full-load efficiency ratings are not providing good information to consumers. The current metrics also do not provide any way for manufacturers to demonstrate the potential savings associated with technologies that improve part-load efficiency such as variable-speed compressors.

**We encourage DOE to investigate a dynamic, load-based test procedure to measure both cooling and heating efficiency of WSHPs.** A load-based test would better capture how WSHPs perform in the field under varying loads, including capturing the impact of cycling losses, the potential benefits of variable-speed operation, and the importance of control strategies. Recent work by the CSA Group in developing such a test for residential central air conditioners and heat pumps could potentially serve as a model for a load-based test for WSHPs.<sup>3</sup>

Thank you for considering these comments.

Sincerely,



Joanna Mauer  
Technical Advocacy Manager  
Appliance Standards Awareness Project



Chris Perry  
Senior Analyst, Buildings Program  
American Council for an Energy-Efficient  
Economy



Joe Vukovich  
Energy Efficiency Advocate  
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<sup>3</sup> CSA EXP07 Public Review Draft/September 2017.