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

March 10, 2022

Mr. Jeremy Dommu
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-2022-BT-STD-0002: Request for Information for Energy Conservation Standards for Fans and Blowers

Dear Mr. Dommu:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), American Council for an Energy-Efficient Economy (ACEEE), Natural Resources Defense Council (NRDC), and the Northwest Energy Efficiency Alliance (NEEA) on the request for information (RFI) for standards for fans and blowers. 87 Fed. Reg. 7048 (February 8, 2022). We appreciate the opportunity to provide input to the Department.

In the RFI, DOE seeks comment on issues related to potential standards for air circulating fans (ACFs), a subset of fans and blowers. First, we support DOE establishing standards for ACFs including air circulating fan heads (ACFHs), box fans, personnel coolers, and table fans. Second, we encourage DOE to carefully consider motor efficiency and blade design when analyzing potential technology options aimed at improved ACF efficiency. Third, we encourage DOE to further investigate which fan types may be included as personnel coolers and which may warrant separate product classes. Finally, we encourage DOE to cover very-small diameter (VSD) ceiling fans as ACFs if they are not included in scope for the ongoing ceiling fans rulemaking.

We encourage DOE to establish standards for ACFs including ACFHs, box fans, personnel coolers, and table fans. Generally, ACFs are fans used to circulate air within a confined space for use in agriculture, manufacturing, etc. The total global market for all fans and blowers is approximately 20 billion USD,[1] while ventilation, the primary market for ACFs, was valued at over 2 billion USD.[2] In the October 2021 RFI for fans and blowers test procedures,[3] ACFHs were targeted for inclusion as a subset of fans and blowers. In the current standards RFI, DOE is considering including box fans, personnel coolers, and table fans in addition to ACFHs as potential categories of ACFs. We support DOE in these efforts as we

[1] https://www.mordorintelligence.com/industry-reports/fans-and-blowers-market
[2]https://www.grandviewresearch.com/industry-analysis/ventilation-fan-market
[3]86 Fed. Reg. 54412.

believe personnel coolers, box fans, and table fans meet the definition of "fan and blower" and thus should be included in the scope for potential energy conservation standards.

We encourage DOE to carefully consider motor efficiency and blade design when analyzing potential technology options and resulting energy savings. ACFs utilizing direct drive AC motor fans often use less energy than a comparable belt-driven fan with similar blade diameter and delivered airflow. Further, DC motors can offer even greater reductions in energy usage; DOE's preliminary analysis for ceiling fans suggests energy usage decreases by more than half when transitioning from a traditional AC induction motor to a DC motor.[4] While these results may not be directly applicable to ACFs, they highlight the significant energy savings potential of DC motors for driving fans.

Furthermore, we understand that blade and aerodynamic design plays a crucial role in ACF efficiency. While some fans utilize rudimentary single-thickness steel fan blades,[5] some manufacturers (e.g. Multi-Wing America) use advanced engineering designs for airfoil blades aimed at delivering high-efficiency and performance benefits; airfoil blades are shaped like an airplane wing, reducing pressure losses. Overall, improved motor efficiency and blade design offer substantial potential energy savings and we encourage DOE to carefully analyze these technology options as part of this standards rulemaking.

We encourage DOE to further investigate which fan types may be included as personnel coolers. DOE states in the RFI that they have tentatively included drum fans, barrel fans, and portable blowers under the definition of personnel coolers. We understand that drum fans and barrel fans are both portable, axial fans marketed as serving the same general purpose (personnel cooling), and models appear to have comparable ranges of airflow and input power as similar axial fans marketed as personnel coolers.[6] However, portable blowers are often marketed for drying floors rather than personnel cooling.[7] Moreover, these fans are centrifugal fans that appear significantly less efficient in terms of airflow generated per input power. Thus, we encourage DOE to consider whether a separate equipment class may be warranted for portable blowers.

We encourage DOE to develop appropriate definitions for ACFs. In the RFI, DOE provides the AMCA 230-15 definitions for ACFHs, box fans, personnel coolers, and table fans. While these definitions are generally useful in understanding the types of fans targeted for inclusion, they need further refinement to clarify the specific fan types to be included within the scope of any future ACF test procedures and efficiency standards. For example, in some cases the AMCA definitions describe how the products are used, whereas appropriate regulatory definitions would better distinguish these products based on their physical characteristics.

We encourage DOE to cover relevant VSD ceiling fans not included in scope for ceiling fans as ACFs. As discussed in the supplemental NOPR for ceiling fan test procedures, the physical characteristics of many VSD ceiling fans are more akin to air circulating fan heads (ACFHs).[8] In particular, many VSD fans have a diameter-to-maximum operating speed ratio less than 0.06 and thus would be excluded from the scope of ceiling fans under the proposed definition; however, these diameter-to-maximum operating speed

[4]EERE-2021-BT-STD-0011-0015, www.regulations.gov/document/EERE-2021-BT-STD-0011-0015
[5]EERE-2013-BT-STD-0006-0001, www.regulations.gov/document/EERE-2013-BT-STD-0006-0001
[6]www.airmovers.com/air-movers/barrel-drum-fans.html; www.cincinnatifan.com/personnel-coolers.htm
[7]www.uline.com/BL_8874/Portable-Blowers
[8]86 Fed. Reg. 69550.

ratios of less than 0.06 are consistent with ACFHs. We thus encourage DOE to cover these VSD fans as ACFs as part of the fans and blowers rulemaking.

Thank you for considering these comments.

Sincerely,

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