

Appliance Standards Awareness Project  
American Council for an Energy-Efficient Economy  
National Consumer Law Center  
Natural Resources Defense Council

July 28, 2011

Ms. Brenda Edwards  
U.S. Department of Energy  
Building Technologies Program  
Mailstop EE-2J  
1000 Independence Avenue, SW  
Washington, DC 20585-0121

**RE: Docket Number EERE-2011-BT-DET-0045: Proposed Determination of Coverage for Commercial and Industrial Fans, Blowers, and Fume Hoods**

Dear Ms. Edwards:

This letter constitutes the comments of the Appliance Standards Awareness Project (ASAP), American Council for an Energy-Efficient Economy (ACEEE), National Consumer Law Center (NCLC), and Natural Resources Defense Council (NRDC) in response to the Department of Energy (DOE) proposed determination of coverage for commercial and industrial fans, blowers, and fume hoods. 76 Fed. Reg. 37678 (June 28, 2011). We appreciate the opportunity to provide input to the Department.

**Fans, blowers, and fume hoods represent a significant potential for energy savings.** DOE estimates that commercial and industrial fans, blowers, and fume hoods consume approximately 256 billion kWh per year.<sup>1</sup> On a primary energy basis, the electricity consumption of these products is about 2.6 quads,<sup>2</sup> which is equivalent to about 6.5 percent of total U.S. electricity consumption.<sup>3</sup> The magnitude of commercial and industrial fan, blower, and fume hood energy use suggests that even small improvements in the efficiency of these products could achieve significant national energy savings. Therefore, we encourage DOE to initiate test procedure and standards rulemakings for commercial and industrial fans, blowers, and fume hoods.

**We encourage DOE to cover those products for which the Department will set standards.** The determination of scope of coverage will be a fundamental issue in a potential rulemaking for commercial and industrial fans, blowers, and fume hoods. Below we describe specific categories of products that DOE could consider addressing in a rulemaking. However, the scope of coverage for energy conservation standards clearly cannot be determined before a rulemaking is well underway. Therefore, we suggest that DOE not finalize any determination of coverage before initiating a standards rulemaking.

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<sup>1</sup> 76 Fed. Reg. 37679.

<sup>2</sup> Assuming primary energy use is about three times the site energy use.

<sup>3</sup> Total U.S. electricity consumption in 2010 was about 40 quads on a primary energy basis.  
[http://www.eia.gov/totalenergy/data/monthly/pdf/sec2\\_3.pdf](http://www.eia.gov/totalenergy/data/monthly/pdf/sec2_3.pdf).

**DOE could consider focusing on specific categories of fans and blowers that are well-defined in the market and that have large annual sales volumes.** We recognize the complexity associated with many individual fan and blower applications and we understand that it may not be feasible to conduct a standards rulemaking that covers all commercial and industrial fans, blowers, and fume hoods. An alternative approach could focus on categories of products designed for specific applications including the following:

- Agricultural ventilation fans: Agricultural ventilation fans are tested and rated according to Air Movement and Control Association (AMCA) standards. The Bioenvironmental and Structural Systems (BESS) Laboratory at the University of Illinois provides performance test data, including ventilating efficiency ratio (cfm/watt), for agricultural ventilation fans.<sup>4</sup> According to BESS, efficiencies of commercially available agricultural ventilation fans typically vary by a factor of 2.<sup>5</sup>
- Commercial kitchen exhaust fans: ENERGY STAR estimates that there are more than one million commercial kitchen ventilation systems installed in the U.S.<sup>6</sup> Standard commercial kitchen exhaust fans are single-speed and run continuously during a kitchen's operating hours.
- Cooling tower fans: The National Renewable Energy Laboratory (NREL) has developed blade root and tip airfoils that can reduce the power consumption of cooling tower fans.<sup>7</sup> Fiberglass reinforced plastic (FRP) fans have been extensively employed in cooling towers in India and are designed to reduce power consumption by about 30 percent compared to conventional aluminum fans.<sup>8</sup>
- Fans for central (built-up) commercial HVAC systems: A 1999 Arthur D. Little report estimated that parasitic energy use, or the energy required to distribute heating and cooling within a building, reject to the environment the heat discharged by cooling systems, and move air for ventilation, consumes approximately 1.5 quads on a primary energy basis and represents about 10 percent of commercial energy use.<sup>9</sup> The report noted that the majority of this parasitic energy consumption (83 percent) is associated with supply and return fans of air handling units and exhaust fans used for ventilation. While packaged systems consume about half of the total parasitic energy, central systems consume about 32 percent, or roughly 0.5 quads of primary energy per year. We note that fans are components of packaged (unitary) commercial HVAC equipment and that fan energy use is captured in the efficiency ratings of packaged systems. Therefore, it seems appropriate to exclude fans that are components of packaged HVAC systems from any energy conservation standards for fans and blowers and to instead focus on fans used with central (built-up) commercial HVAC systems.

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<sup>4</sup> <http://bess.illinois.edu/type.asp>

<sup>5</sup> <http://bess.illinois.edu/selcrit.html>

<sup>6</sup> <http://www.cee1.org/com/com-kit/files/ProgramGuidanceDemandControlVentilation.pdf>. p. 10

<sup>7</sup> [http://www.swifterfans.com/main/Final\\_Technical\\_Article\\_Jan.pdf](http://www.swifterfans.com/main/Final_Technical_Article_Jan.pdf)

<sup>8</sup> <http://www.coolingtowersmanufacturer.com/frp-fans.html>

<sup>9</sup> [http://apps1.eere.energy.gov/buildings/publications/pdfs/commercial\\_initiative/hvac\\_volume2\\_final\\_report.pdf](http://apps1.eere.energy.gov/buildings/publications/pdfs/commercial_initiative/hvac_volume2_final_report.pdf). p. 1-1.

- **Fume hoods:** Fume hoods have been studied extensively due to the safety considerations associated with their operation and their significant energy consumption. According to Lawrence Berkeley National Lab, a typical fume hood uses 3.5 times as much energy as a home.<sup>10</sup> We recognize that the efficiency of fume hoods will necessarily be a secondary consideration to safety considerations.

Per-unit energy savings from efficiency improvements for the five product categories listed above can be substantial due to high operating hours. Agricultural ventilation fans and fume hoods, for example, may operate 24 hours a day. In addition, the product categories described above have large annual sales volumes and therefore represent significant potential for national energy savings.

**We encourage DOE to ensure that mixed flow fans are included in any definitions of fans and blowers.** The proposed determination of coverage notes that DOE is considering a definition for fans that distinguishes axial and centrifugal fans based on whether the fan accelerates the airstream along the axis of the fan (axial fans) or radially (centrifugal fans).<sup>11</sup> In mixed flow fans, air flows in both axial and radial directions.

**We encourage DOE to consider including inlet and outlet devices as part of the regulated product.** The design of inlet and outlet devices can have a significant impact on fan and blower efficiency. We understand that most fans are sold with inlet and outlet devices as a package. Therefore, we encourage DOE to explore the feasibility of including inlet and outlet devices (when sold with the fan) in the scope of test procedures and standards to allow for capturing energy savings from improved inlet and outlet designs.

Thank you very much for considering these comments.

Sincerely,



Joanna Mauer  
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Appliance Standards Awareness Project



R. Neal Elliott, Ph.D., P.E.  
Associate Director for Research  
American Council for an Energy-Efficient Economy

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<sup>10</sup> <http://hightech.lbl.gov/fh-calc.html>

<sup>11</sup> 76 Fed. Reg. 37679.



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



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