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

February 13, 2024

Mr. Jeremy Dommu
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Building Technologies Office, EE-2B
1000 Independence Avenue SW
Washington, DC 20585

RE: Docket Number EERE-2020-BT-STD-0007: Energy Conservation Standards for Expanded Scope Electric Motors

Dear Mr. Dommu:

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) on behalf of its low-income clients, and the Natural Resources Defense Council (NRDC) on the notice of proposed rulemaking (NOPR) for expanded scope electric motor (ESEM) standards. 88 Fed. Reg. 87062 (December 15, 2023). We appreciate the opportunity to provide input to the Department.

We strongly support DOE's proposed rule for ESEMs, which is based on the Electric Motors Working Group's December 2022 joint recommendation.[1] If finalized, DOE's proposed rule would provide very large national energy savings of nearly 9 quads and total consumer benefits of over $70 billion. The NOPR proposes the first efficiency standards for several motor topologies including both air-over (AO) and non-AO permanent split capacitor (PSC), shaded pole, and split-phase motors. The NOPR also covers additional types of capacitor-start induction-run (CSIR), capacitor-start capacitor-run (CSCR), and polyphase motors that are not covered by the existing standards for small electric motors (e.g., AO and/or enclosed motors). The proposed standards would ensure that these currently unregulated motors, which are used in a wide variety of applications,[2] meet a minimum level of efficiency.

DOE's proposed ESEM standards are highly cost-effective for purchasers. In the NOPR, DOE has proposed to adopt Trial Standard Level (TSL) 2, which reflects the recommended efficiency levels in the 2022 Working Group joint recommendation for both non-AO and AO ESEMs. At TSL 2, the average life-cycle cost (LCC) savings range from $26 to $160, with simple payback periods (PBPs) of 0.7 to 2.0 years across each of the representative units (RUs) analyzed.[3] Overall, the shipment-weighted average LCC savings are $102 with an average PBP of 1.2 years.[4] The per-unit operating cost savings for ESEM purchasers are also quite significant in comparison to the typical ESEM purchase price. For example, the

[1]EERE-2020-BT-STD-0007-0038, www.regulations.gov/comment/EERE-2020-BT-STD-0007-0038
[2]For example: fans, compressors, pumps, conveyors, and industrial food processing.
[3]Tables V–2 to V–21. 88 Fed. Reg. 87111–87115.
[4]88 Fed. Reg. 87133.

lifetime operating cost savings for the 0.25 hp low-torque non-AO motor RU at TSL 2 relative to a baseline motor ($380) are nearly double the installed cost of the motor at TSL 2 ($213).[5]

We support DOE's updated engineering analysis. In support of the NOPR, DOE presents a robust engineering approach for estimating ESEM costs as a function of efficiency for each analyzed RU. As part of the NOPR analysis, DOE performed testing and teardowns of 17 ESEM models and consulted with industry stakeholders to inform the engineering and cost analysis.[6] Importantly, DOE also constrained motor frame size (i.e., diameter) at higher efficiency levels to that of a baseline motor for each RU; this assumption reflects the likelihood that motor manufacturers will avoid increasing frame size in order to mitigate impacts on OEM products using ESEMs. Consistent with the 2010 final rule for small electric motors, DOE also limited design stack length (i.e., length of the motor core) to a 20% increase. Although constraining motor size at higher efficiencies may overestimate costs for many end-use applications where motor size is not a significant concern (e.g., PSC motors in some fan applications), DOE's analysis represents a reasonable estimate of ESEM costs at higher efficiency levels.

We support DOE's proposed standards for AO ESEMs. Consistent with the Working Group's December 2022 joint recommendation, DOE's proposed efficiency levels for AO ESEMs match those proposed for non-AO ESEMs. In contrast to non-AO motors, AO motors are cooled primarily by an external airstream rather than an internal fan. Beyond self-cooling capability, AO and non-AO ESEMs are typically quite similar in construction. In some cases, both AO and non-AO ESEMs may be manufactured on the same line, with the only difference being that an internal fan is not installed on the AO variant. Additionally, the same technology options used to improve motor efficiency broadly (thinner electrical steel laminations, increased slot fill, etc.) may be implemented to improve AO ESEM efficiency; the lack of an internal fan may even improve the efficiency of an AO ESEM in comparison to a non-AO ESEM. Thus, it is reasonable for efficiency standards for AO ESEMs to match those for equivalent non-AO ESEMs.

We support DOE's coverage of ESEMs used in covered equipment. The proposed standards for both AO and non-AO ESEMs would apply to motors regardless of whether they are sold alone or embedded into covered equipment.[7] While energy efficiency improvements for ESEM-containing products subject to standards (i.e., covered equipment) may require more efficient motors, the presence of ESEMs in covered equipment does not preclude the possibility of cost-effective efficiency standards for ESEMs that deliver significant energy savings. For example, covering ESEMs ensures that consumers have access to efficient replacement motors (e.g., central AC condenser fan motors). Further, as DOE notes in the NOPR, the proposed standards are expected to have minimal impact on covered product re-designs. For covered equipment identified as potentially using ESEMs,[8] all either have a compliance date for amended standards at or before the proposed 2029 ESEM compliance date, and/or would require a motor that is out of scope of the rule (e.g., electronically commutated motors). Finally, since ESEMs used in covered equipment are often purchased by the OEM from a motor manufacturer, exempting ESEMs used in covered equipment would create enforcement challenges (i.e., it would be difficult to determine a given ESEM's end-use application).

[5]Table V-6. 88 Fed. Reg. 87111.
[6]EERE-2020-BT-STD-0007-0056, p. 5-7. www.regulations.gov/document/EERE-2020-BT-STD-0007-0056
[7]88 Fed. Reg. 87080.
[8]Walk-in coolers and freezers, circulator pumps, air circulating fans, and commercial unitary air conditioning equipment. 88 Fed. Reg. 87081.

Thank you for considering these comments.

Sincerely,

Jeremy Dunklin, PhD
Technical Advocacy Associate
Appliance Standards Awareness Project

Steve Nadel
Executive Director
American Council for an Energy-Efficient Economy

Berneta Haynes
National Consumer Law Center
(On behalf of its low-income clients)

Joe Vukovich
Energy Efficiency Advocate
Natural Resources Defense Council