Comment on Electric Motor Rulemaking Framework Document

Docket Number EERE-2010-BT-STD-0027/Regulation Identifier Number (RIN) 1904-AC28

Submitted by the Appliance Standards Awareness Project (ASAP) and the National Electrical Manufacturers Association (NEMA)

Supporting organizations: American Council for an Energy-Efficient Economy, Alliance to Save Energy, Advanced Energy, Earthjustice, Natural Resources Defense Council, Northeast Energy Efficiency Partnerships, and Northwest Energy Efficiency Alliance

Introduction and Summary

We appreciate the opportunity to submit this joint comment concerning the Department of Energy's (DOE) Framework Document for the electric motors rulemaking. The Framework Document deals predominately with DOE's plans for analyzing increased efficiency levels for currently regulated motors. However, DOE also acknowledges its authority to expand its scope. (Framework Document at p. 6, "In this rulemaking, DOE is also considering expanding the scope of coverage for electric motors standards as necessary to carry out the goals of EPCA…"). We believe that by far the largest energy savings opportunity with respect to electric motor standards lies in expansion of scope, rather than increasing stringency above NEMA Standard MG 1, Table 12-12 levels. Therefore, we recommend that DOE's rulemaking and related analyses should be re-oriented to focus on expanded scope.

The current scope of motors subject to existing national standards leaves out a significant portion of the integral horsepower, poly-phase motor population in the United States. Many motors defined by NEMA as "definite purpose" or "special purpose" within the integral-horsepower, poly-phase category should be covered along with the current "general purpose" motors at the efficiency levels specified by NEMA Standard MG 1, Table 12-12. Many advanced motor types, including motors using permanent magnet technology, electronically commutated motor technology, or switched reluctance motor technology should remain excluded from national standards. Test procedures and labeled efficiency levels for these motors are still in development, and the market for these motors is still emerging so it is premature to initiate standards development at this time.

Previous rules have already increased standards for currently covered motors to upwards of 95% efficiency. Analysis by NEMA shows that increasing the Minimum Efficiency Performance Standards (MEPS) for covered, general-purpose motors might increase their efficiency by 0.7%[1] on average. However, such increases could have serious harmful consequences that would undermine energy savings and impair the ability of the market to provide motors which meet the needs of American industry. For example, standards above the Table 12-12 levels would increase the rate of repair and rewind, increasing the longevity of old, inefficient motors. Moreover, at levels above Table 12-12, meeting certain electrical characteristics necessary for some applications becomes extremely difficult. Finally, forcing manufacturers to invest in small increases above Table 12-12 for a segment of motor sales would divert R&D resources from far more promising advanced motors technologies and could impact competition.

On the other hand, expanding the definition of "covered product" to include many "definite purpose" or "special purpose" motors would increase the efficiency of these previously-unregulated motors by 2.2% to 5.3% without the serious negative side effects of raising existing motor standards. Our initial estimates indicate an order of magnitude greater savings can be achieved by expanding scope compared to raising the MEPS on most existing regulated motors.

[1] Boteler, Rob. "Motor Efficiency EISA Regulations Impact: Utility Programs need to Prioritize Efficiency Options for Results," presentation to ACEEE. July 14th, 2010.

In addition, expanded coverage would dramatically simplify compliance and enforcement. The current ambiguity in definition of covered products combined with the large number of parameters that are used to determine whether a motor is covered by MEPS, has raised compliance questions and complicates DOE's enforcement task. We believe that a broader scope of covered product will be clearer, thus making compliance and enforcement more straightforward. Clear compliance rules and effective enforcement are critical, both for achieving intended energy savings and for providing a level playing field for manufacturers. The 14 NEMA manufacturers who make good-faith efforts to comply are unfairly undercut by manufacturers and importers who circumvent standards. We thus recommend that the Department simplify definitions of covered products in this rulemaking to make the standards more easily enforced by starting with a broad definition of covered motors covered with standards at NEMA table 12-12 levels, and then excluding only specific narrowly defined motor types.

Recommended Approach to Rulemaking

NEMA and ASAP, and their associated supporting organizations which have signed onto these comments, are exploring a consensus agreement related to this DOE docket. While we have not reached a specific agreement yet, in general, we are in agreement on the following principles for the further expansion of standards (MEPS) for motors beyond those required by the *Energy Independence and Security Act of 2007* (EISA):

1. The vast majority of poly-phase, integral horsepower induction motors between 1 and 500 horsepower (and their metric equivalents) should be covered by MEPS at the MG 1, Table 12-12 efficiency level;[2]
2. The scope of products not covered by MEPS should be limited to specifically defined exceptions (as discussed below);
3. Expanding the scope of products covered by MEPS will simplify compliance and enforcement;
4. Expanding the coverage of MG 1, Table 12-12 efficiency levels is in the best interest of consumers, domestic manufacturers and the economy; and
5. The MG 1, Table 12-12 efficiency levels and expanded scope of coverage should go into effect as soon as is feasible.

We believe that these principles offer the best path forward to attain the largest technically feasible and economically justified energy savings on as accelerated a schedule as possible. Such standards would impose manageable costs on manufacturers and minimal disruption in the marketplace. Manufacturers could produce the motors that would be covered by a proposed expansion in scope, designing models at the MG 1, Table 12-12 level. Thus, while there would still be costs to manufacturers, they would not impose an undue burden and standards could go into effect as soon as 18 months after the Department issues its final rule. Much larger and far more disruptive investments would be needed to comply with standards above Table 12-12 levels, even for a small segment of the motors market. At least some motor manufacturers may find such investments non-economic and exit affected portions of the market.

We understand that DOE intends to evaluate increased efficiency levels for currently regulated motors. However, we strongly believe that this evaluation will show that standards increased above the Table 12-12 levels will not meet the statutory requirements for technical feasibility and economic justification. Thus, we do not support MEPS for any motors covered under this rulemaking at levels above the NEMA MG-1 Table 12-12 level at this time. We believe that levels above those shown in Table 12-12 will not be justified for the following reasons:

1. For many motor types, technical parameters become very difficult to meet. For example, the physical size of the motor housing cannot be increased in many applications. Also, it may be difficult or impossible to design and manufacture motors that achieve the NEMA Design B

[2] The motors and motor consensus standards covered by these Joint Comments do not include, and are not intended to include, any motors for which efficiency standards have already been established in DOE's Small Motors Standards Rule. 75 Federal Register 10874 (March 9, 2010).

electrical parameters due to an increase in the inrush current beyond that specified in the MG-1 standard for these more efficient products;

2. Levels above Table 12-12 will require the use of materials that result in cost increases that are a significant burden on motor purchasers and which will likely far outweigh lifetime operating savings;
3. Motor owners almost always have the choice between a new motor purchase and a repair and rewind of their existing motor. Most often a rewind is cheaper than a new motor and, for some users, may have the added attraction of making minimal changes to the user's motor system. As a result, changes induced by efficiency standards, which significantly increase new motor costs or change the physical or electrical characteristics of the motor may encourage a shift from replacement to repair. Extending the operating life of older, pre-EPAct motors would result in a very large lost savings opportunity relative to the replacement of the existing motor with a new one at the Table 12-12 efficiency level. This problem is exacerbated by the failure of some repairs and rewinds to return a motor to even its previous efficiency level.
4. The largest future potential for motor efficiency savings will be from advanced motor designs such as ECM, SRM and IPM. These designs can enable a level of motor speed control that allow for the optimization of motor systems, while not experiencing the efficiency penalties that results from variable speed drive technologies used on induction motors. Any standard higher than Table 12-12 levels would force manufacturer investments to small improvements for conventional motor designs, potentially displacing R&D and capital investments in much more promising energy saving technologies.
5. Competition could be negatively affected. Some motor manufacturer may elect to exit portions of the market rather than invest in levels above Table 12-12.

We encourage DOE to take these issues into consideration as it evaluates potential standards for this rulemaking.

Definition of an Electric Motor

Another important issue directly related to this rulemaking is the definition of an electric motor. The drafting of the EISA legislation inadvertently deleted the statutory definition. While the Congressional committees of jurisdiction have drafted technical corrections to the legislation that address this issue, the legislation has yet to pass. DOE has indicated that it will propose a definition through a supplemental notice of proposed rulemaking (SNOPR), though as of the drafting of these comments DOE has yet to issue the SNOPR. The absence of a definition results in an ambiguity as to what products are covered under the existing MEPS, and by extension this rulemaking. This ambiguity creates two problems:

1. It presents the Department with a challenge to identify covered products and makes any resulting enforcement activity difficult. Motor manufacturers are reporting that some importers and original equipment manufacturers are attempting to use this ambiguity to circumvent the standards.
2. While the NEMA motor manufacturers have made a good faith efforts to comply with what they understood was the Congressional intent with respect to covered product, the absence of a clear and final definition makes investment and production decisions difficult.

We urge DOE to publish the SNOPR as soon as possible to address these existing areas of ambiguity. NEMA presented recommendations concerning definitions at the Framework hearing. We urge DOE to consider these recommendations.

In addition, we are working on developing recommendations for regulatory definitions that can be applied for purposes of expanding scope of coverage. We will submit our recommendations to the test method SNOPR docket, or to this docket, if available sooner.

We also encourage DOE to address other issues related to test procedures which relate to the expansion of scope we envision for the motor standards. For example, some motors (e.g. vertical motors) cannot be tested on a standard dynamometer. Provisions for testing various special and definite purpose motors may be required.

Finally, the IEEE and CSA test standards have been updated. We urge DOE to update its test method to be consistent with these internationally-recognized methods of test.

Suggested Scope of Covered Products

ASAP and NEMA have been discussing which products should be covered under an expanded scope at the Table 12-12 level. Generally, we recommend that the defined scope of covered product should shift from an approach which explicitly includes enumerated types of motors, to an approach based on a presumption that all motors are covered except for those explicitly exempted or regulated at an efficiency level below the Table 12-12 level.

Such a broad-based approach must include a workable mechanism for handling new exceptions. New exceptions may be needed because DOE and stakeholders in this docket simply may not think of every needed exception during the rulemaking process. The Department will need to put in place a process to expeditiously consider additional types of motors that may need to be exempted from coverage at the Table 12-12 levels. We encourage the Department to begin considering how such a process would be put in place.

Table 1 provided in the appendix to these comments suggests examples of the scope of product that would be included as covered product at Table 12-12 efficiency levels. Notes in the table indicate where modification may be required for the test procedures and where additional action is needed by NEMA to clarify the existing standards. Appendix Table 2 represents our current attempt to describe the physical and electrical characteristics of the very limited set of motors which we recommend should be explicitly excluded from Table 12-12 efficiency levels.

We are continuing to discuss the details of these tables among ourselves and may submit more detailed explanations to the Department in the future. We would also be pleased to meet with DOE to discuss these tables and provide further explanation as needed.

Issues Related to Enforcement

A national standard that requires virtually all motors to meet table 12-12 levels would simplify the marketplace, making compliance and enforcement more straightforward. A motors market characterized by multiple standard levels applied to various product classes with some motors that remain unregulated altogether will inevitably lead to gaming as well as confusion as to which standard applies to a given motor. Improved compliance and enforcement will both assure expected energy savings and provide greater fairness for the 14 NEMA manufacturers who make good-faith efforts to comply. Too often, those who comply are undercut by manufacturers and importers who circumvent standards by tweaking motor designs or simply importing non-compliant motors. We thus encourage the Department to seek to broaden and simplify definitions of covered products in this coming rulemaking to make the standards more easily enforced.

We note that Fire Pump motors remain a concern as a possible loophole. While these motors are defined by National Fire Protection Association (NFPA) and are designated as NFPA covered product by being painted red, they can be used in general-purpose applications. The extremely low operating hours for these motors (i.e. less than an hour per year) support a conclusion that their standards not be increased. However, we urge DOE to consider approaches for minimizing the risk that this motor type be exploited as a loophole. For example, DOE could track shipments of Fire Pump motors in order to identify if there is a widespread pattern of abuse emerging. Another approach may be more explicit labeling or marking of these motors.

Preliminary Assessment of Savings

We anticipate that the savings from significantly expanding the scope of coverage to products at the Table 12-12 level will produce significantly more energy savings than would increasing the efficiency levels for a limited set of motors. Based on our preliminary analyses, we expect the savings from expanding scope would be an order of magnitude greater than increased levels for currently regulated motors.

The parties to these comments are undertaking their own assessment of the savings from various approaches to this rulemaking. We anticipate the results of this analysis will be available early next year. However, our analysis as well as DOE's work for this docket will be significantly improved by better data about the current motor marketplace.

Need for Better Data

This rulemaking makes clear the need for better and more extensive market data on electric motors. The last comprehensive survey of motor energy use and sales in the United States was prepared for the Department in 1998. In addition, the Census Bureau discontinued collection of data on motor shipments and imports in 2003. Without accurate, up-to-date information on the marketplace and installed base of electric motors, the Department and others such as parties to these comments and energy efficiency programs cannot accurately determine the best course of action when raising standards. ACEEE[3] and other organizations have advocated in the past for increased funding for critical data collection such as this, and we reiterate it here. Pending federal legislation has called for the motor market study to be updated, and an on-going process be initiated to maintain the currency of this information.

As DOE undertakes the analysis in support of this rulemaking, we encourage the Department to attempt to address these data issues. Specifically, we recommend collecting data on the following issues:

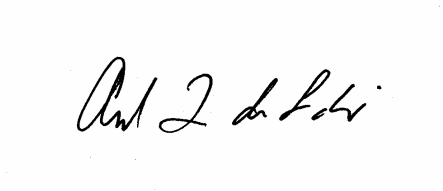
- Installed motors (baseline), by:
    - Region
    - 3- to 5-digit SIC/NAICS
    - Motor type & subtype (general/special/definite purpose; partial, footless, etc.)
    - Horsepower rating
    - End use (pumping, fan, compressor, materials handling, etc.)
    - End-use load (brake hp)
    - Hours of operation
    - Age
    - Electricity Rates
- Shipments & Imports, by:
    - Channel (i.e., OEM equipment manufacturer, distributor, etc.)
    - Motor type & subtype (general/special/definite purpose; partial, footless, etc.)
    - Horsepower/Frame size
    - End use (pumping, fan, compressor, etc.), to the extent known
- Rewind vs. replace
    - Decision framework
    - Practices
    - Business volume, by HP and motor type & subtype,
- Motors or systems incentive programs
    - Presence or absence, by region or zip code
    - Type of program

[3] R. Gold and R.N. Elliott, 2010, *Where Have All the Data Gone? The Crisis of Missing Energy Efficiency Data*, http://aceee.org/research-report/e101.

We are aware that some of this information is available for some markets and, in some cases, at the regional level. We are prepared to assist the Department and its contractors in identifying and obtaining access to this information to enable the Department to make a more informed decision.

Thank you for the opportunity to submit these comments. Please do not hesitate to contact us if you have any questions.

Sincerely yours,



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American Council for an Energy-Efficient Economy
Alliance to Save Energy
Advanced Energy
Earthjustice
Natural Resources Defense Council
Northeast Energy Efficiency Partnerships
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