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**[6450-01-P]**

**DEPARTMENT OF ENERGY**

**10 CFR Part 431**

**[EERE-2019-BT-STD-0008]**

**Energy Conservation Program: Energy Conservation Standards for Small Electric Motors**

**AGENCY:** Office of Energy Efficiency and Renewable Energy, Department of Energy.

**ACTION:** Request for Information.

**SUMMARY:** The U.S. Department of Energy (“DOE”) is initiating an effort to determine whether to amend the current energy conservation standards for small electric motors. Under the Energy Policy and Conservation Act of 1975, as amended (“EPCA”), DOE must review these standards at least once every six years and publish either a notice of proposed rulemaking (“NOPR”) to propose new standards for small electric motors or a notice of determination that the existing standards do not need to be amended. This request for information (“RFI”) solicits information from the public to help DOE determine whether amending the standards for small electric motors would result in significant energy savings and whether such standards would be technologically feasible and economically justified. DOE welcomes written comments from the public on any subject within the scope of this document (including topics not raised in this RFI).

**DATES:** Written comments and information are requested and will be accepted on or before  
[INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

**ADDRESSES:** Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at <http://www.regulations.gov>. Follow the instructions for submitting comments. Alternatively, interested persons may submit comments, identified by docket number EERE-2019-BT-STD-0008, by any of the following methods:

- *Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the instructions for submitting comments.
- *E-mail:* [SmallElecMotors2019STD0008@ee.doe.gov](mailto:SmallElecMotors2019STD0008@ee.doe.gov). Include the docket number EERE-2019-BT-STD-0008 in the subject line of the message.
- *Postal Mail:* Appliance and Equipment Standards Program, U.S. Department of Energy, Building Technologies Office, Mailstop EE-5B, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. If possible, please submit all items on a compact disc (“CD”), in which case it is not necessary to include printed copies.
- *Hand Delivery/Courier:* Appliance and Equipment Standards Program, U.S. Department of Energy, Building Technologies Office, 950 L’Enfant Plaza, SW., 6<sup>th</sup> Floor, Washington, DC, 20024. Telephone: (202) 287-1445. If possible, please submit all items on a CD, in which case it is not necessary to include printed copies.

No telefacsimiles (faxes) will be accepted. For detailed instructions on submitting comments and additional information on the rulemaking process, see section III of this document.

*Docket:* The docket for this activity, which includes *Federal Register* notices, comments, and other supporting documents/materials, is available for review at <http://www.regulations.gov>. All documents in the docket are listed in the <http://www.regulations.gov> index. However, some documents listed in the index, such as those containing information that is exempt from public disclosure, may not be publicly available.

The docket web page can be found at <http://www.regulations.gov/#!docketDetail;D=EERE-2019-BT-STD-0008>. The docket web page will contain instructions on how to access all documents, including public comments, in the docket. See section III for information on how to submit comments through <http://www.regulations.gov>.

**FOR FURTHER INFORMATION CONTACT:**

Mr. Jeremy Domm, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, EE-5B 1000 Independence Avenue SW., Washington, DC 20585-0121. Telephone: (202) 586-9870. Email: [ApplianceStandardsQuestions@ee.doe.gov](mailto:ApplianceStandardsQuestions@ee.doe.gov).

Michael Kido, U.S. Department of Energy, Office of the General Counsel, GC-33, 1000 Independence Avenue, SW., Washington, DC 20585-0121. Telephone: (202) 586-8145. E-mail: *Michael.Kido@hq.doe.gov*.

For further information on how to submit a comment, review other public comments and the docket, contact the Appliance and Equipment Standards Program staff at (202) 586-6636 or by e-mail: *ApplianceStandardsQuestions@ee.doe.gov*.

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## **I. Introduction**

### **A. Authority and Background**

The Energy Policy and Conservation Act of 1975, as amended (“EPCA” or “the Act”),<sup>1</sup> among other things, authorizes DOE to regulate the energy efficiency of a number of consumer products and industrial equipment. (42 U.S.C. 6291–6317). Title III, Part C<sup>2</sup> of EPCA, added by Public Law 95-619, Title IV, section 441(a), established the Energy Conservation Program for Certain Industrial Equipment, which sets forth a variety of provisions designed to improve energy efficiency. This equipment includes small electric motors, the subject of this RFI. (See generally 42 U.S.C. 6311(13)(G) and 42 U.S.C. 6317(b))

Under EPCA, DOE’s energy conservation program consists essentially of four parts: (1) testing, (2) labeling, (3) Federal energy conservation standards, and (4) certification and enforcement procedures. Relevant provisions of the Act specifically include definitions (42 U.S.C. 6311), energy conservation standards (42 U.S.C. 6313), test procedures (42 U.S.C. 6314), labeling provisions (42 U.S.C. 6315), and the authority to require information and reports from manufacturers (42 U.S.C. 6316). EPCA includes specific authority to establish test procedures and standards for small electric motors. (42 U.S.C. 6317(b))

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<sup>1</sup> All references to EPCA in this document refer to the statute as amended through the America’s Water Infrastructure Act of 2018, Public Law 115–270 (October 23, 2018).

<sup>2</sup> For editorial reasons, upon codification in the U.S. Code, Part C was redesignated Part A-1.

Federal energy efficiency requirements for covered equipment established under EPCA generally supersede State laws and regulations concerning energy conservation testing, labeling, and standards. (See 42 U.S.C. 6316(a) and (b); 42 U.S.C. 6297(a)-(c)).

EPCA defines “small electric motor” as “a NEMA general purpose alternating current single-speed induction motor, built in a two-digit frame number series in accordance with NEMA Standards Publication MG 1–1987.” (42 U.S.C. 6311(13)(G)) EPCA directed DOE to establish a test procedure for those small electric motors for which DOE makes a determination that energy conservation standards would be technologically feasible and economically justified, and would result in significant energy savings. (42 U.S.C. 6317(b)(1)) EPCA further directed DOE to prescribe energy conservation standards for those small electric motors for which test procedures were established. (42 U.S.C. 6317(b)(2)) Additionally, EPCA prescribed that any such standards shall not apply to any small electric motor which is a component of a covered product or covered equipment under EPCA. (42 U.S.C. 6317(b)(3))

On July 10, 2006, DOE published its determination that energy conservation standards for certain single-phase, capacitor-start, induction-run, small electric motors are technologically feasible and economically justified, and would result in significant energy savings. 71 FR 38799. DOE completed the first rulemaking cycle in 2010 by publishing a final rule (the “2010 standards Final Rule”), which established energy conservation standards for small electric



motors manufactured starting on March 9, 2015.<sup>3</sup> 75 FR 10874 (March 9, 2010). The current energy conservation standards are located in title 10 of the Code of Federal Regulations (“CFR”) part 431, section 446. The currently applicable DOE test procedures for small electric motors appear at 10 CFR 431.444.

EPCA requires that, not later than 6 years after the issuance of any final rule establishing or amending a standard, DOE evaluate the energy conservation standards for each type of covered equipment, including those at issue here, and publish either a notice of determination that the standards do not need to be amended, or a NOPR that includes new proposed energy conservation standards (proceeding to a final rule, as appropriate). (42 U.S.C. 6316(a); 42 U.S.C. 6295(m)(1)). DOE must make the analysis on which the determination is based publicly available and provide an opportunity for written comment. (42 U.S.C. 6316(a); 42 U.S.C. 6295(m)(2)) In making a determination that the standards do not need to be amended, DOE must evaluate whether amended standards (1) will result in significant conservation of energy, (2) are technologically feasible, and (3) are cost effective as described under 42 U.S.C. 6295(o)(2)(B)(i)(II). (42 U.S.C. 6316(a); 42 U.S.C. 6295(m)(1)(A)) (Under 42 U.S.C. 6295(o)(2)(B)(i)(II), DOE must determine whether the benefits of the standard exceed its burdens by, to the greatest extent practicable, considering the savings in operating costs throughout the estimated average life of the covered product in the type (or class) compared to

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<sup>3</sup> In a technical correction, DOE revised the compliance date for energy conservation standards to March 9, 2015, for each small electric motor manufactured (alone or as a component of another piece of non-covered equipment), or March 9, 2017, in the case of a small electric motor which requires listing or certification by a nationally recognized safety testing laboratory. 75 FR 17036 (April 5, 2010).

any increase in the price of, or in the initial charges for, or maintenance expenses of, the covered products which are likely to result from the imposition of the standard. See 42 U.S.C.

6295(m)(1)(A), 6295(n)(2), and 6295(o)(2)(B)(i)(II).) In determining whether to propose new standards, DOE must evaluate that proposal against the criteria of 42 U.S.C. 6295(o) and follow the rulemaking procedures set out in 42 U.S.C. 6295(p).

DOE is publishing this RFI to collect data and information to inform its decision consistent with its obligations under EPCA.

#### B. Rulemaking Process

DOE must follow specific statutory criteria for prescribing new or amended standards for covered equipment. EPCA requires that a new or amended energy conservation standard prescribed by the Secretary be designed to achieve the maximum improvement in energy or water efficiency that is technologically feasible and economically justified. (42 U.S.C. 6316(a); 42 U.S.C. 6295(o)(2)(A)). To determine whether a standard is economically justified, EPCA requires that DOE determine whether the benefits of the standard exceed its burdens by considering, to the greatest extent practicable, the following seven factors:

- (1) The economic impact of the standard on the manufacturers and consumers of the affected equipment;
- (2) The savings in operating costs throughout the estimated average life of the equipment compared to any increases in the initial cost, or maintenance expense;
- (3) The total projected amount of energy savings likely to result directly from the

standard;

(4) Any lessening of the utility or the performance of the equipment likely to result from the standard;

(5) The impact of any lessening of competition, as determined in writing by the Attorney General, that is likely to result from the standard;

(6) The need for national energy and water conservation; and

(7) Other factors the Secretary of Energy (Secretary) considers relevant.

(42 U.S.C. 6316(a); 42 U.S.C. 6295(o)(2)(B)(i)(I)-(VII))

DOE fulfills these and other applicable requirements by conducting a series of analyses throughout the rulemaking process. Table I-1 shows the individual analyses that are performed to satisfy each of the requirements within EPCA.

**Table I-1 EPCA Requirements and Corresponding DOE Analysis**

<b>EPCA Requirement</b>	<b>Corresponding DOE Analyses</b>
<b>Technological Feasibility</b>	<ul style="list-style-type: none"> <li>• Market and Technology Assessment</li> <li>• Screening Analysis</li> <li>• Engineering Analysis</li> </ul>
<b>Economic Justification:</b>	
1. Economic impact on manufacturers and consumers	<ul style="list-style-type: none"> <li>• Manufacturer Impact Analysis</li> <li>• Life-Cycle Cost and Payback Period Analysis</li> <li>• Life-Cycle Cost Subgroup Analysis</li> <li>• Shipments Analysis</li> </ul>
2. Lifetime operating cost savings compared to increased cost for the product	<ul style="list-style-type: none"> <li>• Markups for Product Price Determination</li> <li>• Energy and Water Use Determination</li> <li>• Life-Cycle Cost and Payback Period Analysis</li> </ul>
3. Total projected energy savings	<ul style="list-style-type: none"> <li>• Shipments Analysis</li> <li>• National Impact Analysis</li> </ul>
4. Impact on utility or performance	<ul style="list-style-type: none"> <li>• Screening Analysis</li> <li>• Engineering Analysis</li> </ul>
5. Impact of any lessening of competition	<ul style="list-style-type: none"> <li>• Manufacturer Impact Analysis</li> </ul>
6. Need for national energy and water conservation	<ul style="list-style-type: none"> <li>• Shipments Analysis</li> <li>• National Impact Analysis</li> </ul>
7. Other factors the Secretary considers relevant	<ul style="list-style-type: none"> <li>• Employment Impact Analysis</li> <li>• Utility Impact Analysis</li> <li>• Emissions Analysis</li> <li>• Monetization of Emission Reductions Benefits</li> <li>• Regulatory Impact Analysis</li> </ul>

As detailed throughout this RFI, DOE is publishing this document seeking input and data from interested parties to aid in the development of the technical analyses on which DOE will ultimately rely to determine whether (and if so, how) to amend the standards for small electric motors.

## **II. Request for Information and Comments**

In the following sections, DOE has identified a variety of issues on which it seeks input to aid in the development of the technical and economic analyses regarding whether to amend its standards for small electric motors. Additionally, DOE welcomes comments on other issues relevant to the conduct of this rulemaking that may not specifically be identified in this document. In particular, DOE notes that under Executive Order 13771, “Reducing Regulation and Controlling Regulatory Costs,” Executive Branch agencies such as DOE are directed to manage the costs associated with the imposition of expenditures required to comply with Federal regulations. See 82 FR 9339 (February 3, 2017). Consistent with that Executive Order, DOE encourages the public to provide input on measures DOE could take to lower the cost of its energy conservation standards rulemakings, recordkeeping and reporting requirements, and compliance and certification requirements applicable to small electric motors while remaining consistent with the requirements of EPCA.

### **A. Equipment Covered by This Request for Information**

This RFI covers equipment that meet the definition of small electric motor, as codified in 10 CFR 431.442. The definition for small electric motor was most recently amended in a test procedure final rule. 74 FR 32059 (July 7, 2009).

#### **1. Definition of “Small Electric Motor”**

Section 340(13)(G) of EPCA, as amended by the Energy Independence and Security Act of 2007 (“EISA 2007”), defines “small electric motor” as “a NEMA general purpose alternating-current single-speed induction motor, built in a two-digit frame number series in accordance with

NEMA Standards Publication MG 1–1987.” (42 U.S.C. 6311(13)(G)). As part of that definition, DOE clarified that it includes “IEC metric equivalent motors.” 10 CFR 431.442. DOE currently regulates the energy efficiency of those small electric motors that fall within three topologies: capacitor-start induction-run (“CSIR”), capacitor-start capacitor-run (“CSCR”), and certain polyphase motors. See 10 CFR 431.446.

Issue A.1 DOE requests comment on whether the definition for the types of motors that comprise small electric motors. In particular, DOE requests feedback on whether definitions of “capacitor-start induction-run,” “capacitor-start capacitor-run,” and “polyphase” within the context of the small electric motor definition are needed – or whether cross-references to particular industry-based standards would suffice. DOE also requests input on whether revisions to any of the other definitions found – or otherwise related to – the small electric motor regulations at subpart X of 10 CFR part 431 are needed.

## 2. Small Electric Motors Currently Subject to Standards

Subpart X of 10 CFR part 431 includes energy conservation standards and test procedures for the small electric motors listed in Table II-1. DOE is currently not considering any changes to the scope of applicability of energy conservation standards for small electric motors.

**Table II-1 Small Electric Motors Currently Subject to Energy Conservation Standards**

Motor Topology		Pole Configuration	Motor Output Power
Single-phase	CSIR	2, 4, 6	0.25 – 3 hp (0.18 – 2.2 kW)*

	CSCR	2, 4, 6	0.25 – 3 hp (0.18 – 2.2 kW)
Polyphase		2, 4, 6	0.25 – 3 hp (0.18 – 2.2 kW)
Certain motor categories are not currently subject to standards. These include: <ul style="list-style-type: none"> <li>• Polyphase, 6-pole, 2 and 3 hp motors;</li> <li>• CSCR and CSIR, 6-pole, 1.5, 2, and 3 hp motors;</li> <li>• CSCR and CSIR, 4-pole, 3 hp motors.</li> </ul> *The values in parentheses are the equivalent metric ratings.			

## B. Market and Technology Assessment

The market and technology assessment that DOE routinely conducts when analyzing the impacts of a potential new and/or amended energy conservation standard provides information about the relevant industry that will be used in DOE's analysis. DOE uses qualitative and quantitative information to characterize the structure of the industry and market. DOE identifies manufacturers, estimates market shares and trends, addresses regulatory and non-regulatory initiatives intended to improve energy efficiency or reduce energy consumption, and explores the potential for efficiency improvements in the design and manufacturing of small electric motors. DOE also reviews product literature, industry publications, and company websites. Additionally, DOE considers conducting interviews with manufacturers to improve its assessment of the market and available technologies for small electric motors.

### 1. Equipment Classes

When evaluating and establishing energy conservation standards, DOE may divide covered equipment into equipment classes by the type of energy used, by capacity, or other performance-related feature. (42 U.S.C. 6316(a); 41 U.S.C. 6295(q)). In making a determination whether capacity or another performance-related feature would justify a different standard, DOE

must consider such factors as the utility of the feature to the consumer and other factors DOE deems appropriate. (*Id.*)

For small electric motors, DOE currently specifies standards in 10 CFR 431.446 for 62 equipment classes<sup>4</sup> that are delineated by motor topology (polyphase, CSIR, or CSCR), pole configuration (2, 4, or 6 poles), and rated motor horsepower/standard kilowatt equivalent (0.25 to 3 horsepower or 0.18 to 2.2 kilowatts). 75 FR 10874, 10886-10887. Chapter 3 of the 2010 Final Rule technical support document (“TSD”) provides additional details on the establishment of the 62 equipment classes.<sup>5</sup> Tables II-3, II-4, and II-5 that follow enumerate each equipment class (“EC”) found in the DOE standards.

**Table II-2 Equipment Classes for Polyphase Small Electric Motors with Open Construction**

<b>Motor Horsepower/Standard Kilowatt Equivalent</b>	<b>Six Poles</b>	<b>Four Poles</b>	<b>Two Poles</b>
0.25/0.18	EC # 1	EC # 2	EC # 3
0.33/0.25	EC # 4	EC # 5	EC # 6
0.50/0.37	EC # 7	EC # 8	EC # 9
0.75/0.55	EC # 10	EC # 11	EC # 12
1/0.75	EC # 13	EC # 14	EC # 15
1.5/1.1	EC # 16	EC # 17	EC # 18
2/1.5	-	EC # 19	EC # 20
3/2.2	-	EC # 21	EC # 22

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<sup>4</sup> The term “equipment classes” is used here to refer to the classes identified as “Product Classes” in the 2010 standards final rule.

<sup>5</sup> See Small Electric Motors Final Rule TSD chapter 3 at: [www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053](http://www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053).



**Table II-3 Equipment Classes for Capacitor-Start Induction-Run Small Electric Motors with Open Construction**

<b>Motor Horsepower/Standard Kilowatt Equivalent</b>	<b>Six Poles</b>	<b>Four Poles</b>	<b>Two Poles</b>
0.25/0.18	EC #23	EC # 24	EC # 25
0.33/0.25	EC #26	EC #27	EC #28
0.5/0.37	EC #29	EC # 30	EC # 31
0.75/0.55	EC #32	EC # 33	EC # 34
1/0.75	EC #35	EC # 36	EC # 37
1.5/1.1	-	EC #38	EC # 39
2/1.5	-	EC #40	EC # 41
3/2.2	-	-	EC #42

**Table II-4 Equipment Classes for Capacitor-Start Capacitor-Run Small Electric Motors with Open Construction**

<b>Motor Horsepower/Standard Kilowatt Equivalent</b>	<b>Six Poles</b>	<b>Four Poles</b>	<b>Two Poles</b>
0.25/0.18	EC #43	EC #44	EC #45
0.33/0.25	EC #46	EC #47	EC #48
0.5/0.37	EC #49	EC #50	EC #51
0.75/0.55	EC #52	EC #53	EC #54
1/0.75	EC #55	EC #56	EC #57
1.5/1.1	-	EC #58	EC #59
2/1.5	-	EC #60	EC #61
3/2.2	-	-	EC #62

For the 2010 standards Final Rule, DOE considered CSIR and CSCR motors to be distinct equipment classes because of efficiency and physical size differences due to the presence of a run capacitor. The run capacitor of a CSCR motor is often mounted in an external housing, and therefore; DOE was concerned that CSCR motors may have limited utility in space constrained applications compared to CSIR motors which do not have a run capacitor. However, DOE ultimately established the same energy conservation standards for both CSIR and CSCR

motors. Based on a recent review of major motor manufacturer catalogs, DOE has found no CSIR motors for sale that meet or exceed the current energy conservation standards. The physical size or type of start and run capacitors used on CSCR motors may have changed since the 2010 standards Final Rule, possibly permitting the use of a CSCR motor in space-constrained applications. In light of the possibility that CSIR motors may no longer be offered for sale and CSCR motor have been able to effectively take the place of CSIR motors in space-constrained applications, DOE may consider combining these classes into a single equipment class because they are typically advertised to serve the same applications and they provide similar features (*e.g.*, high locked-rotor torque).

Issue B.1 DOE requests feedback on the current small electric motor equipment classes and whether changes to these individual equipment classes and their descriptions should be made, or whether certain classes should be merged (*e.g.*, CSCR and CSIR equipment classes) or separated. Has the physical size or type of start and run capacitors changed since the 2010 standards Final Rule, (*e.g.*, a shift from paper and foil capacitors to smaller metallized film capacitors)? DOE further requests feedback on whether combining certain classes could impact equipment utility by eliminating any performance-related features or impact the stringency of the current energy conservation standard for this equipment. DOE also requests comment on separating any of the existing equipment classes and whether it would impact equipment utility by eliminating any performance-related features or reduce any compliance burdens. DOE requests information on the potential manufacturer burden associated with either merging or separating such classes.

Issue B.2 DOE seeks information regarding any other new equipment classes meeting the small electric motor definition that it should consider for inclusion in its analysis. Specifically, DOE requests information on the performance-related features (*e.g.*, input power supply, operating speed, *etc.*) that provide unique consumer utility and data detailing the corresponding impacts on energy use that would justify separate equipment classes (*i.e.*, explanation for why the presence of these performance-related features would increase energy consumption).

## 2. Technology Assessment

In analyzing the feasibility of potential new or amended energy conservation standards, DOE uses information about existing and past technology options and prototype designs to help identify technologies that manufacturers could use to meet and/or exceed a given set of energy conservation standards under consideration. In consultation with interested parties, DOE intends to develop a list of technologies to consider in its analysis. That analysis will likely include a number of the technology options DOE previously considered during its previous rulemaking for small electric motors. A complete list of those prior options appears in Table II-5. See also, 75 FR 10874, 10887.<sup>6</sup>

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<sup>6</sup> For a description of how each of these technology options would improve small electric motor efficiency, see Small Electric Motors Final Rule TSD chapter 3 and chapter 4 at [www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053](http://www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053)

**Table II-5 Technology Options to Increase Small Electric Motor Efficiency**

Category of Loss to Reduce	Technology Option Applied
I <sup>2</sup> R Losses (Resistive losses, stemming from current flow)	Use copper die-cast rotor cage
	Remove skew on conductor cage
	Increase cross-sectional area of rotor conductor bars
	Increase end ring size
	Changing gauges of copper wire in stator
	Manipulate stator slot size
	Decrease the radial air gap
	Change run-capacitor rating
Core Losses (Losses created in the steel components of a motor from hysteresis losses and eddy currents.)	Improve grade of electrical steel
	Use thinner steel laminations
	Anneal steel laminations
	Add stack height ( <i>i.e.</i> , length, add electrical steel laminations)
	Use high-efficiency lamination materials
	Use plastic bonded iron powder
Friction and Windage Losses (Losses from bearing friction and an imperfect cooling fan system)	Use better bearings and lubricant
	Install a more efficient cooling system

DOE is not aware of specific techniques manufacturers use to reduce stray-load losses, which are any losses that are not attributed to I<sup>2</sup>R losses, core losses, or friction and windage losses and otherwise unaccounted for. DOE notes that general process changes to the manufacturing of rotors and stators could potentially reduce such losses.

Issue B.3 DOE seeks information on the technologies listed in Table II-5 regarding their applicability to the current market and how these technologies may impact the efficiency of small electric motors as measured according to the DOE test procedure. DOE also seeks information on how these technologies may have changed since they were considered in the 2010 standards Final Rule analysis. Specifically, DOE seeks information on the range of efficiencies or performance characteristics that are currently available for each technology

option. DOE also seeks information regarding the cost-effectiveness associated with introducing each of the listed options in achieving improved energy efficiency for small electric motors – e.g., what are the expenses of implementing each of the listed options compared to the energy and related cost savings potential that each of these options would be likely to bring to the end user.

Issue B.4 DOE seeks comment on other technology options that it should consider for inclusion in its analysis and whether these technologies may impact equipment features or consumer utility. DOE also seeks input regarding the cost-effectiveness of implementing these options.

### C. Screening Analysis

The purpose of the screening analysis is to evaluate the technologies that improve equipment efficiency to determine which technologies will be eliminated from further consideration and which will be passed to the engineering analysis for further consideration.

DOE determines whether to eliminate certain technology options from further consideration based on the following criteria:

- 1) Technological feasibility. Technologies that are not incorporated in commercial products or in working prototypes will not be considered further.

- 2) Practicability to manufacture, install, and service. If it is determined that mass production of a technology in commercial products and reliable installation and servicing of the technology could not be achieved on the scale necessary to serve the relevant market at the time of the effective date of the standard, then that technology will not be considered further.
- 3) Impacts on equipment utility or equipment availability. If a technology is determined to have significant adverse impact on the utility of the equipment to significant subgroups of consumers, or result in the unavailability of any covered equipment type with performance characteristics (including reliability), features, sizes, capacities, and volumes that are substantially the same as equipment generally available in the United States at the time, it will not be considered further.
- 4) Adverse impacts on health or safety. If it is determined that a technology will have significant adverse impacts on health or safety, it will not be considered further.

10 CFR part 430, subpart C, appendix A, 4(a)(4) and 5(b).

Technology options identified in the technology assessment are evaluated against these criteria using DOE analyses and inputs from interested parties (*e.g.*, manufacturers, trade organizations, and energy efficiency advocates). Options that pass through the screening analysis are referred to as “design options” in the engineering analysis. Technology options that fail to meet one or more of the four criteria are eliminated from consideration.

Table II.6 summarizes the technology options that DOE screened out in the 2010 standards Final Rule, and the applicable screening criteria.

**Table II.6 Previously Screened Out Technology Options from the 2010 Standards Final Rule**

	<b>EPCA Criteria (X = Basis for Screening Out)</b>			
<b>Screened Technology Option</b>	<b>Technological Feasibility</b>	<b>Practicability to Manufacture, Install, and Service</b>	<b>Adverse Impact on Product Utility</b>	<b>Adverse Impacts on Health and Safety</b>
<b>Plastic Bonded Iron Powder</b>	<b>X</b>			
<b>Radial Air Gap &lt;0.0125 inches</b>		<b>X</b>		

Issue C.1 DOE requests feedback on what impact, if any, the four screening criteria described in this section would have on each of the technology options listed in Table II-5 with respect to small electric motors. Similarly, DOE seeks information regarding how these same criteria would affect any other technology options not already identified in this document with respect to their potential use in small electric motors.

Issue C.2 With respect to the screened out technology options listed in Table II.6, DOE seeks information on whether these options would remain screened out under the four screening criteria described in this section, and if so, DOE requests any current or projected assessment regarding each technology option that would support further consideration of that option in DOE's analysis. With respect to each of these technology options, what steps, if any, could be

(or have already been) taken to facilitate the introduction of each option as a means to improve the energy efficiency performance of small electric motors and the potential to impact the utility of the small electric motor to end-users? DOE in particular seeks information on the potential impact of these technologies on the utility of the small electric motor to end-users and the impact to the use of the small electric motor in the larger equipment.

#### D. Engineering Analysis

The engineering analysis estimates the cost-efficiency relationship of equipment at different levels of increased energy efficiency (“efficiency levels”). This relationship serves as the basis for the cost-benefit calculations for consumers, manufacturers, and the Nation. In determining the cost-efficiency relationship, DOE estimates the increase in manufacturer production cost (“MPC”) associated with increasing the efficiency of equipment above the baseline efficiency level, up to the maximum technologically feasible (“max-tech”) efficiency level for each equipment class.

DOE historically has used the following three methodologies to generate incremental manufacturing costs and establish efficiency levels (“ELs”) for analysis: (1) the design-option approach, which provides the incremental costs of adding to a baseline model design options that will improve its efficiency; (2) the efficiency-level approach, which provides the relative costs of achieving increases in energy efficiency levels, without regard to the particular design options used to achieve such increases; and (3) the cost-assessment (or reverse engineering) approach, which provides “bottom-up” manufacturing cost assessments for achieving various levels of



increased efficiency, based on detailed cost data for parts and materials, labor, shipping/packaging, and investment for models that operate at particular efficiency levels.

## 1. Baseline Efficiency Levels

For each established equipment class, DOE selects a baseline model as a reference point against which any changes resulting from energy conservation standards under consideration can be measured. The baseline model in each equipment class represents the characteristics of common or typical equipment in that class. Typically, a baseline model is one that meets the current minimum energy conservation standards and provides basic consumer utility.

Consistent with this analytical approach, DOE tentatively plans to consider the current minimum energy conservation standards for small electric motors (which were required for compliance starting on March 9, 2015 and, for small electric motors requiring listing or certification by a nationally recognized safety testing laboratory, on March 9, 2017) to establish the baseline efficiency levels for each equipment class. The current standards for each equipment class are based on average full load efficiency. The current standards for small electric motors are found in 10 CFR 431.446.

Issue D.1 DOE requests feedback on whether using the current energy conservation standards for small electric motors are appropriate baseline efficiency levels for DOE to apply to each equipment class in evaluating whether to amend the current energy conservation standards for this equipment. DOE requests data and suggestions on how to evaluate the baseline

efficiency levels to better evaluate whether the current energy conservation standards for this equipment merit further amending.

Issue D.2 DOE requests feedback on whether CSIR motors subject to the small electric motor standards are currently for sale and whether DOE should analyze a CSIR baseline if it decides to consider amending or otherwise revising the standards for small electric motors.

Issue D.3 DOE requests feedback on the appropriate baseline efficiency levels for any newly analyzed equipment classes that are not currently in place or for the contemplated combined equipment classes, as discussed in section II.B.1 of this document. For those combined equipment classes DOE is considering for its analysis, as well as for any additional equipment classes suggested for further examination, DOE requests energy use data regarding each of these classes to develop a baseline relationship between efficiency and rated output power and number of poles.

## 2. Maximum Available and Maximum Technologically Feasible Levels

As part of DOE's analysis, the maximum available efficiency level is the highest efficiency unit currently available on the market. For the 2010 standards Final Rule, DOE did not analyze all 62 small electric motor equipment classes. Rather, DOE focused on three equipment classes and applied the analysis of those classes to the remaining equipment classes. These representative equipment classes generally represented the most common (by shipments) pole configuration and horsepower ratings (*i.e.*, 1-horsepower, four-pole, polyphase motors; ½-horsepower, four-pole, CSIR motors; and ¾-horsepower, four-pole, CSCR motors). See 75 FR

10874, 10888 and chapter 5 of the final rule TSD for that rulemaking.<sup>7</sup> DOE identified the maximum available efficiencies listed in motor manufacturer product catalogs for three representative equipment classes, listed in Table II-7.

**Table II-7 Maximum Efficiency Levels Currently Available**

<b>Representative Equipment Class</b>	<b>Maximum Available Motor Efficiency (%)</b>	<b>Current Energy Conservation Standard (%)</b>
1-horsepower, four-pole, polyphase motors	85.5	83.5
<sup>3</sup> / <sub>4</sub> -horsepower, four-pole, CSCR motors	81.8	81.8
<sup>1</sup> / <sub>2</sub> -horsepower, four-pole, CSIR motors	N/A*	81.8

\*Based on review of motor catalogs, no CSIR motors meeting or exceeding current energy conservation standards.

DOE defines a max-tech efficiency level to represent the theoretical maximum possible efficiency if all available design options are incorporated in a motor model. In many cases, the max-tech efficiency level is not commercially available because it is not economically feasible. In the 2010 standards final rule, DOE determined max-tech efficiency levels using motor design modeling with the most efficient design parameters that were technologically feasible. These motor models were based on the use of all design options applicable to the specific equipment classes.

Issue D.4 DOE seeks input on whether the maximum available efficiency levels are appropriate and technologically feasible for potential consideration as possible energy conservation standards for the equipment at issue – and if not, why not. DOE also requests feedback on whether the maximum available efficiencies presented in Table II-7 are

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<sup>7</sup> See Small Electric Motors Final Rule TSD chapter 5 at: [www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053](http://www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053).

representative of those for the small electric motor equipment classes that are currently regulated but were not directly analyzed in the 2010 standards Final Rule. To the extent that the range of possible efficiencies differs from the efficiencies of the other equipment classes that were not directly analyzed, what alternative approaches should DOE consider using to represent the efficiency of those equipment classes and why?

Issue D.5 DOE seeks feedback on what design options would likely be incorporated at a max-tech and maximum-available efficiency level, and on the efficiency values associated with those levels. As part of this request, DOE also seeks information as to whether there are limitations on the use of certain combinations of design options.

### 3. Manufacturer Production Costs and Manufacturer Selling Price

As described at the beginning of this section, the main outputs of the engineering analysis are cost-efficiency relationships that describe the estimated increases in manufacturer production cost associated with higher-efficiency equipment for the analyzed equipment classes. For the 2010 standards final rule, DOE developed the cost-efficiency relationships by using a reverse-engineering process where cost models were developed based on the results of a tear down process for representative units.

In the 2010 standards final rule, DOE analyzed both space-constrained and non-space-constrained representative units for some efficiency levels. The space-constrained representative unit uses higher-grade materials to maintain motor stack length within 20 percent of the baseline design, while the non-space-constrained representative unit increases motor size (increased stack

length up to 100 percent, same frame size) while using lower-grade materials. The non-space-constrained representative unit is larger, but less expensive to produce. The space-constrained representative unit is more expensive to produce and would only be selected by customers with applications that cannot accept a larger motor.

Issue D.6 DOE requests feedback on how manufacturers would incorporate the technology options listed in Table II-5 and not screened out in Table II.6 to increase energy efficiency in small electric motors beyond the baseline. This includes information on the order in which manufacturers would incorporate the different technologies to incrementally improve the efficiencies of motors. DOE also requests feedback on whether the increased energy efficiency would lead to other design changes that would not occur otherwise. DOE is also interested in information regarding any potential impact of design options on a manufacturer's ability to incorporate additional functions or attributes in response to consumer demand, as well as a manufacturer's ability to satisfy the demand for small electric motors used in current applications.

Issue D.7 DOE also seeks input on the increase in MPC associated with incorporating each particular design option. Specifically, DOE is interested in whether and how the costs estimated for design options in the 2010 standards Final Rule have changed since the time of that analysis. DOE also requests information on the investments (including related costs) necessary to incorporate specific design options, including, but not limited to, costs related to new or modified tooling (if any), materials, engineering and development efforts to implement each design option, and manufacturing/production impacts.

Issue D.8 DOE requests comment on whether certain design options may not apply to (or be incompatible with) specific equipment classes.

Issue D.9 DOE requests comment on whether space-constrained applications exist that cannot accept a change in motor size, the market share of these applications, and how that market share varies by equipment class.

As described in section II.D.2 of this document, DOE analyzed three equipment classes in the 2010 standards Final Rule. DOE developed cost-efficiency curves for each of these equipment classes that were used as the input for the downstream analyses conducted in support of that rulemaking. See chapter 5 of the 2010 standards Final Rule TSD for the cost-efficiency curves developed in that rulemaking.<sup>8</sup>

Issue D.10 DOE seeks feedback on whether the approach of analyzing a sub-set of equipment classes is appropriate for evaluating the feasibility of potential energy conservation standards for small electric motors. DOE requests comment on whether it is necessary to individually analyze all three representative equipment classes analyzed in the 2010 standards Final Rule – and if so, why. If analyzing a sub-set of small electric motor classes is sufficient, what minimum number of classes should DOE analyze – and how should those classes be

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<sup>8</sup> See Small Electric Motors Final Rule TSD chapter 5 at: [www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053](http://www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053).

distributed among the 62 separate classes that DOE currently regulates. Additionally, DOE seeks comment on whether DOE's prior approach of analyzing particular equipment classes and applying those results to the remaining classes remains appropriate in principle – and if not, why not? For example, if it is necessary to individually analyze more than the three equipment classes used in the 2010 standards Final Rule, please provide information on why aggregating certain equipment is not appropriate. If this approach is not appropriate, what alternative approaches should DOE consider using as an alternative and why?

To account for manufacturers' non-production costs and profit margin, DOE applies a non-production cost multiplier (the manufacturer markup) to the MPC. The resulting manufacturer selling price ("MSP") is the price at which the manufacturer distributes a unit into commerce. For the 2010 standards final rule, DOE used three manufacturer markups to account for costs that are part of each motor leaving a manufacturer's facility:

- Handling and scrap factor: 2.5 percent markup. This markup was applied to the direct material production costs of each motor. It accounts for the handling of material and the scrap material that cannot be used in the production of a finished small electric motor.
- Factory overhead: 17.5 or 18.0 percent markup. DOE applied factory overhead to the direct material production costs, including the handling and scrap factor, and labor estimates. For aluminum rotor designs a 17.5 percent markup was used, but for all copper rotor designs an 18.0 percent markup was used to factor in increased depreciation for the equipment.
- Non-production: 45 percent markup. This markup reflects costs including sales

and general administrative, research and development, interest payments, and profit factor. DOE applied the non-production markup to the sum of the direct material production, the handling and scrap, the direct labor, and the factory overhead otherwise known as the MPC.

DOE prepared these estimated markups based on corporate reports and conversations with manufacturers and experts. See chapter 5 of the 2010 standards final rule TSD<sup>9</sup> for further detail.

Issue D.11 DOE requests feedback on whether the manufacturer markups used in the 2010 standards final rule would be appropriate for use in a potential small electric motors standards rulemaking. If the markups require revision, what specific revisions are needed for each? Are there additional markups that DOE should also consider – if so, which ones and why?

#### E. Distribution Channels

In generating end-user price inputs for the life-cycle cost (“LCC”) analysis and national impact analysis (“NIA”), DOE must identify distribution channels (*i.e.*, how the small electric motors are distributed from the manufacturer to the consumer), and estimate relative sales volumes through each channel. In the 2010 standards final rule, DOE accounted for three distribution channels for small electric motors and estimated their respective shares of sales volume: (1) from manufacturers to original equipment manufacturers (“OEMs”), who

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<sup>9</sup> See Small Electric Motors Final Rule TSD chapter 5 at: [www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053](http://www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053).



incorporate motors in larger pieces of equipment, to OEM equipment distributors, to contractors, and then to end-users (65 percent of shipments); (2) from manufacturers to wholesale distributors, to OEMs, to OEM equipment distributors, to contractors, and then to end-users (30 percent of shipments); and (3) from manufacturers to distributors or retailers, to contractors and then to end-users (5 percent of shipments). In that rulemaking, DOE recognized that contractors are not used in all installations, because some firms have in-house technicians who would install equipment or replace a motor. However, at the time, DOE had no information on the extent to which this occurs, so it assumed that all channels also included a contractor.<sup>10</sup> Should sufficient information become available, DOE may consider including separate distribution channels that do not include contractors in addition to the existing distribution channels previously described.

Issue E.1 DOE requests information on the existence of any distribution channels other than the three channels that were identified in the 2010 standards final rule and as described in section II.E. DOE also requests data on the fraction of small electric motor sales that go through these channels, as well as the fraction of sales that go through any other identified channels.

#### F. Energy Use Analysis

As part of the rulemaking process, DOE conducts an energy use analysis to identify how motors are used by consumers to help determine the energy savings potential of energy efficiency improvements. DOE bases the energy consumption of small electric motors on the

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<sup>10</sup> See Technical Support Document, Chapter 7, Markups for Equipment Price Determination at [www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053](http://www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053)

rated average full-load efficiency as determined by the DOE test procedure and on additional information to represent typical energy consumption in the field, such as: annual operating hours, motor operating load, and part-load efficiency.

In the 2010 standards final rule, DOE determined the annual energy consumption of small electric motors by multiplying the power consumed while in operation by the annual hours of operation in various applications. The power consumed in operation was established as a function of the motor load and of the typical part-load efficiency of small electric motors as characterized in the engineering analysis.<sup>11</sup> DOE used shipments data to establish the share of each motor application and derived distributions of operating hours and load using data referenced in Nadel et al.<sup>12</sup> As part of a potential energy conservation standards rulemaking, DOE would review available motor energy use information and update these inputs as appropriate.

Issue F.1 DOE seeks input on data sources that DOE can use to characterize the variability in annual energy consumption for small electric motors. Specifically, DOE is requesting data and information related to: (1) the distribution of shipments across applications and sectors by equipment class or by motor topology and horsepower; (2) typical operating hours by application and sector; (3) typical motor load by application and sector; and (4) typical load

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<sup>11</sup> See Technical Support Document, Chapter 6, Energy Use Characterization at [www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053](http://www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053)

<sup>12</sup> Nadel, S. ; Elliott, R.N. ; Shepard, M. ; Greenberg, S. ; Katz, G. ; Almeida, A. de, Energy-efficient motor systems: A handbook on technology, programs, and policy opportunities, 2nd edition. 2000. American Council for an Energy-Efficient Economy, Washington, DC (US)

profiles (*i.e.*, percentage of annual operating hours spent at specified load points) by application and sector.

#### G. Life-Cycle Cost and Payback Period Analysis

The purpose of the LCC and payback period (“PBP”) analysis is to analyze the effects of potential new and/or amended energy conservation standards on end users by determining how potential new and/or amended standards would affect their operating expenses (usually decreased) and their total installed costs (usually increased). DOE intends to characterize the variability and uncertainty of the inputs to the LCC and PBP calculations by using statistical distributions where appropriate, and by using Monte Carlo simulations. The analysis results are a distribution of thousands of data points showing the range of LCC savings and PBPs for a given standards case relative to a no new-standards case. In this section, DOE discusses specific inputs to the LCC and PBP analysis for which it requests comment and feedback.

##### 1. Lifetimes

The equipment lifetime is the age at which the equipment is retired from service. In the 2010 standards Final Rule, DOE developed motor lifetime distributions with a mean of seven years for capacitor-start motors and a mean of nine years for polyphase motors. 75 FR 10874, 10901. Each distribution incorporates a correlation between the motor’s annual hours of operation and the motor’s mechanical lifetime. DOE estimated motor mechanical lifetimes of 40,000 hours for polyphase motors and 30,000 hours for single phase motors. In the 2010

standards Final Rule, motor lifetime is governed by two Weibull distributions.<sup>13</sup> One characterizes the motor lifetime in total operating hours (*i.e.*, mechanical lifetime), while the other characterizes the lifetime in years of use in the application. Motors are retired from service at the age when they reach either of these limits. As part of a potential energy conservation standards rulemaking, DOE may consider using a similar approach to characterize motor lifetimes.

Issue G.1 DOE seeks data and input on the appropriate equipment lifetimes for small electric motors both in years and in lifetime mechanical hours that DOE should apply in its analysis.

## 2. Installation Costs

In the 2010 standards Final Rule, DOE assumed that more efficient motors will incur no increased installation costs. Should sufficient information become available, DOE may consider including different installation costs by efficiency levels as appropriate.

Issue G.2 DOE requests feedback and data on whether installation costs differ in comparison to the baseline installation costs for any of the specific technology options listed in Table II-5. In other words, how would the installation costs change (increase, decrease, or no change) if a manufacturer were to incorporate any of the options in Table II-6 when compared to

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<sup>13</sup> The Weibull distribution is one of the more commonly used distributions in reliability. It is commonly used to model time to failure, time to repair and material strength.

the installation costs of a baseline small electric motor. To the extent that these costs differ, DOE seeks supporting data and the reasons for those differences.

### 3. Repair and Maintenance Costs

In the 2010 standards Final Rule, DOE found no evidence that repair or maintenance costs would increase with higher motor energy efficiency. 75 FR 10874, 10900. As part of the current evaluation, DOE reviewed motor repair cost data for small electric motors.<sup>14</sup> Based on this information, DOE found that motors rated at 5 hp or less are typically not repaired – they are replaced. Should DOE determine to undertake an energy conservation standards rulemaking, DOE would further review available motor repair and maintenance cost information and may consider including repair costs in the LCC calculation?

Issue G.3 DOE requests feedback and data on whether repair and maintenance costs differ in comparison to the baseline maintenance costs for any of the specific technology options listed in Table II-5. To the extent that these costs differ, DOE seeks supporting data and the reasons for those differences.

Issue G.4 DOE requests information and data on the repair frequency and repair costs by equipment class for the technology options listed in Table II-5. While DOE is interested in information regarding each of the listed technology options. DOE is also interested in the

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<sup>14</sup> Vaughen's (2013), Vaughen's Motor & Pump Repair Price Guide, 2013 Edition. Available at [www.vaughens.com](http://www.vaughens.com).

frequency of repairs made (as well as the types) and whether end users of this equipment replace or repair the small electric motor once it fails.

#### H. Shipments

DOE develops forecasts of equipment shipments to calculate the national impacts of potential amended energy conservation standards on energy consumption, net present value (“NPV”), and future manufacturer cash flows. DOE shipments projections are based on available historical data broken out by *e.g.*, equipment class, capacity, and efficiency. Current sales estimates allow for a more accurate model that captures recent trends in the market.

Issue H.1 DOE requests 2010-2018 (or the most recently available) annual sales data (*i.e.*, number of shipments) for small electric motors by equipment class. If disaggregated data of annual sales are not available at the equipment class level, DOE requests more aggregated data of annual sales at the motor topology level.

Issue H.2 DOE requests 2010-2018 (or the most recently available) data on the fraction of sales in the residential, commercial, and industrial sector for small electric motors.

For the 2010 standards Final Rule, DOE developed a no-new-standards case shipments model for small electric motors driven by projected macroeconomic activity of the sectors in

which they are used.<sup>15</sup> Annual shipments growth rates for each sector were set as equal to annual growth rates in the following drivers: (1) for industrial and agricultural sectors, manufacturing activity (in value of total shipments, in dollars); (2) for commercial sector, commercial floor space; and (3) for residential sector, number of households. DOE may consider using a similar approach if it undertakes an energy conservation standards rulemaking.

Issue H.3 DOE requests information on the rate at which annual sales (*i.e.*, number of shipments) of small electric motors is expected to change in the next 5 years. If possible, DOE requests this information by motor topology.

Issue H.4 DOE requests data and information on any trends in the motor market that could be used to forecast expected trends in market share by efficiency levels for each equipment class. If disaggregated data are not available at the equipment class level, DOE requests aggregated data at the motor topology level.

For the standards-case shipments projections, in the 2010 standards final rule, DOE assumed some consumers may shift to purchasing enclosed motors (not included in the scope of small electric motors) and used an elasticity of demand of -0.25 for both polyphase and single phase small electric motors to reflect this potential market shift. In addition, for CSIR and CSCR motors, DOE built a combined shipments model, reflecting the fact that these motors may be

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<sup>15</sup> See Technical Support Document, Chapter 9, Shipments Analysis at [www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053](http://www.regulations.gov/document?D=EERE-2007-BT-STD-0007-0053)

used interchangeably in many applications. In the 2010 standards final rule, DOE determined that CSCR motors were, on average, more expensive than CSIR motors for most equipment classes, physically larger due to the space required by a second capacitor, had lower losses, and had a relatively small overall market share. In the no-new-standards case, DOE used a 5 percent market share for CSCR motors and a 95 percent market share for CSIR motors. 75 FR 10874, 10903. However, DOE projected that, if a combination of standards were to be adopted which significantly changed the relative prices of CSCR and CSIR motors, this could result in significant changes in the respective market shares of these motors. DOE developed a model to analyze this potential market shift based on incremental purchase cost, incremental operating losses, and the observed market share in the current market. In the selected standards case in 2016, DOE projected a 93 percent market share for CSCR motors and a 7 percent market share for CSIR motors, assuming all shipments performed at the standard level. As mentioned in section II.B.1, based on a recent review of major motor manufacturer catalogs, DOE found no CSIR motors for sale that meet or exceed current energy conservation standards. Should DOE determine to undertake an energy conservation standards rulemaking, DOE would review available small electric motor shipment information and revise the shares of CSIR and CSCR motors to reflect the actual market?

For a potential energy conservation standards rulemaking, DOE may consider using a similar model with updated market share data to project market shares of small electric motors in the standards-case scenario.



Issue H.5 DOE requests data and information on the extent to which the shift from CSIR motors has been to CSCR motors.

Issue H.6 DOE requests comment on the elasticity value of -0.25 used to characterize how consumers may respond to standards by changing to enclosed motors in the 2010 standards final rule.

Issue H.7 DOE requests data and information on what actions might be likely to have the greatest impact on the motor market if the agency were to amend or otherwise revise the energy conservation standards that are currently in place for small electric motors. For example, are there risks regarding potential market impacts stemming from more stringent – or the broader application of – energy conservation standards for this equipment. If so, what are these potential risks and why are they likely? With respect to these risks, what steps can DOE take to mitigate them while retaining the potential benefits of improved energy savings expected to accrue from amending or otherwise revising the energy conservation standards for small electric motors?

## I. Manufacturer Impact Analysis

The purpose of the manufacturer impact analysis (“MIA”) is to estimate the financial impact from amending the current energy conservation standards on manufacturers of small electric motors, and to evaluate the potential impact of such standards on direct employment and manufacturing capacity. The MIA includes both quantitative and qualitative aspects. The quantitative part of the MIA primarily relies on the Government Regulatory Impact Model (“GRIM”), an industry cash-flow model adapted for equipment covered in this potential

rulemaking, with the key output of industry net present value (“INPV”). The qualitative part of the MIA addresses the potential impacts of amended energy conservation standards on manufacturing capacity and industry competition, as well as factors such as equipment characteristics, impacts on particular subgroups of firms, and important market and product trends.

As part of the MIA for small electric motors, DOE intends to analyze the impacts from amending or otherwise revising the energy conservation standards on subgroups of manufacturers of covered equipment, including small business manufacturers. DOE uses the Small Business Administration’s (“SBA”) small business size standards to determine whether manufacturers qualify as small businesses, which are listed by the applicable North American Industry Classification System (“NAICS”) code.<sup>16</sup> Manufacturing of small electric motors is classified under NAICS 335312, “Motor and Generator Manufacturing,” and the SBA sets a threshold of 1,250 employees or less for a domestic entity to be considered as a small business. This employee threshold includes all employees in a business’ parent company and any other subsidiaries.

One aspect of assessing manufacturer burden involves examining the cumulative impact of multiple DOE standards and the product/equipment-specific regulatory actions of other Federal agencies that affect the manufacturers of a covered product or equipment. While any one

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<sup>16</sup> Available online at <https://www.sba.gov/document/support--table-size-standards>.

regulation may not impose a significant burden on manufacturers, the combined effects of several existing or impending regulations may have serious consequences for some manufacturers, groups of manufacturers, or an entire industry. Assessing the impact of a single regulation may overlook this cumulative regulatory burden. In addition to energy conservation standards, other regulations can significantly affect manufacturers' financial operations. Multiple regulations affecting the same manufacturer can strain profits and lead companies to abandon equipment lines or markets with lower expected future returns than competing equipment. For these reasons, DOE conducts an analysis of cumulative regulatory burden as part of its rulemakings pertaining to appliance efficiency.

Issue I.1 To the extent feasible, DOE seeks the names and contact information of any domestic or foreign-based manufacturers that distribute small electric motors in the United States.

Issue I.2 DOE identified small businesses as a subgroup of manufacturers that could be disproportionately impacted by amended energy conservation standards. DOE requests the names and contact information of small business manufacturers, as defined by the SBA's size threshold, of small electric motors that sell products in the United States. In addition, DOE requests comment on any other manufacturer subgroups that could be disproportionately impacted by amending or otherwise revising the energy conservation standards for small electric motors. DOE requests feedback on any potential approaches that could be considered to address impacts on a given manufacturer subgroup, including small businesses.

Issue I.3 DOE requests information regarding the cumulative regulatory burden impacts on manufacturers of small electric motors associated with (1) other DOE standards applying to different products or equipment that these manufacturers may also make and (2) product-specific regulatory actions of other Federal agencies. DOE also requests comment on whether to coordinate the effective date of any potential small electric motor energy conservation standards with any other regulatory actions to mitigate any cumulative regulatory burden on manufacturers.

#### J. Other Energy Conservation Standards Topics

##### 1. Market Failures

In the field of economics, a market failure is a situation in which the market outcome does not maximize societal welfare. Such an outcome would result in unrealized potential welfare. DOE welcomes comment on any aspect of market failures, especially those in the context of amending or otherwise revising the energy conservation standards for small electric motors.

##### 2. Other

In addition to the issues identified earlier in this document, DOE welcomes comment on any other aspect of energy conservation standards for small electric motors not already addressed by the specific areas identified in this document.

### III. Submission of Comments

DOE invites all interested parties to submit in writing by **[INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**, comments and information on matters addressed in this notice and on other matters relevant to DOE's consideration of potential amended or otherwise revised energy conservations standards for small electric motors. After the close of the comment period, DOE will review the public comments received and may begin collecting data and conducting the analyses discussed in this RFI.

Submitting comments via <http://www.regulations.gov>. The <http://www.regulations.gov> web page requires you to provide your name and contact information. Your contact information will be viewable to DOE Building Technologies Office staff only. Your contact information will not be publicly viewable except for your first and last names, organization name (if any), and submitter representative name (if any). If your comment is not processed properly because of technical difficulties, DOE will use this information to contact you. If DOE cannot read your comment due to technical difficulties and cannot contact you for clarification, DOE may not be able to consider your comment.

However, your contact information will be publicly viewable if you include it in the comment or in any documents attached to your comment. Any information that you do not want to be publicly viewable should not be included in your comment, nor in any document attached to your comment. Persons viewing comments will see only first and last names, organization names, correspondence containing comments, and any documents submitted with the comments.

Do not submit to <http://www.regulations.gov> information for which disclosure is restricted by statute, such as trade secrets and commercial or financial information (hereinafter referred to as Confidential Business Information (“CBI”). Comments submitted through <http://www.regulations.gov> cannot be claimed as CBI. Comments received through the website will waive any CBI claims for the information submitted. For information on submitting CBI, see the Confidential Business Information section.

DOE processes submissions made through <http://www.regulations.gov> before posting. Normally, comments will be posted within a few days of being submitted. However, if large volumes of comments are being processed simultaneously, your comment may not be viewable for up to several weeks. Please keep the comment tracking number that [www.regulations.gov](http://www.regulations.gov) provides after you have successfully uploaded your comment.

Submitting comments via email, hand delivery, or mail. Comments and documents submitted via email, hand delivery, or mail also will be posted to <http://www.regulations.gov>. If you do not want your personal contact information to be publicly viewable, do not include it in your comment or any accompanying documents. Instead, provide your contact information on a cover letter. Include your first and last names, email address, telephone number, and optional mailing address. The cover letter will not be publicly viewable as long as it does not include any comments.

Include contact information each time you submit comments, data, documents, and other

information to DOE. If you submit via mail or hand delivery, please provide all items on a CD, if feasible. It is not necessary to submit printed copies. No telefacsimiles (faxes) will be accepted.

Comments, data, and other information submitted to DOE electronically should be provided in PDF (preferred), Microsoft Word or Excel, WordPerfect, or text (ASCII) file format. Provide documents that are not secured, written in English and free of any defects or viruses. Documents should not contain special characters or any form of encryption and, if possible, they should carry the electronic signature of the author.

Campaign form letters. Please submit campaign form letters by the originating organization in batches of between 50 to 500 form letters per PDF or as one form letter with a list of supporters' names compiled into one or more PDFs. This reduces comment processing and posting time.

Confidential Business Information. According to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email, postal mail, or hand delivery two well-marked copies: one copy of the document marked confidential including all the information believed to be confidential, and one copy of the document marked "non-confidential" with the information believed to be confidential deleted. Submit these documents via email or on a CD, if feasible. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

Factors of interest to DOE when evaluating requests to treat submitted information as confidential include (1) a description of the items, (2) whether and why such items are customarily treated as confidential within the industry, (3) whether the information is generally known by or available from other sources, (4) whether the information has previously been made available to others without obligation concerning its confidentiality, (5) an explanation of the competitive injury to the submitting person which would result from public disclosure, (6) when such information might lose its confidential character due to the passage of time, and (7) why disclosure of the information would be contrary to the public interest.

It is DOE's policy that all comments may be included in the public docket, without change and as received, including any personal information provided in the comments (except information deemed to be exempt from public disclosure).

DOE considers public participation to be a very important part of the process for developing energy conservation standards. DOE actively encourages the participation and interaction of the public during the comment period in each stage of the rulemaking process. Interactions with and between members of the public provide a balanced discussion of the issues and assist DOE in the rulemaking process.



Anyone who wishes to be added to the DOE mailing list to receive future notices and information about this process or would like to request a public meeting should contact Appliance and Equipment Standards Program staff at (202) 287-1445 or via e-mail at *ApplianceStandardsQuestions@ee.doe.gov*.

Signed in Washington, DC, on March 26, 2019.

A handwritten signature in dark ink, reading "Valri Lightner", is written over a horizontal line.

Valri Lightner  
Acting Deputy Assistant Secretary for Energy  
Efficiency  
Energy Efficiency and Renewable Energy