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[6450-01-P]

DEPARTMENT OF ENERGY

10 CFR Part 431

[EERE–2020–BT–STD–0018]

RIN 1904-AE54

Energy Conservation Program: Energy Conservation Standards for Certain Commercial and Industrial Equipment; Early Assessment Review; Commercial and Industrial Pumps

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

ACTION: Request for information.

SUMMARY: The U.S. Department of Energy ("DOE") is undertaking an early assessment review for amended energy conservation standards for commercial and industrial pumps ("pumps") to determine whether to amend applicable energy conservation standards for this equipment. Specifically, through this request for information ("RFI"), DOE seeks data and information to evaluate whether amended energy conservation standards would result in a significant savings of energy; be technologically feasible; and be economically justified. DOE welcomes written comments from the public on any subject within the scope of this document (including those topics not specifically raised in this RFI), as well as the submission of data and other relevant information concerning this early assessment review.

DATES: Written comments and information are requested and will be accepted on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**.

ADDRESSES: Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at *https://www.regulations.gov*. Follow the instructions for submitting comments. Alternatively, interested persons may submit comments, identified by docket number EERE-2021-BT-STD-0018, by any of the following methods:

1. *Federal eRulemaking Portal*: *https://www.regulations.gov*. Follow the instructions for submitting comments.
2. *E-mail*: to *Pumps2021STD0018@ee.doe.gov*. Include docket number EERE-2021-BT-STD-0018 in the subject line of the message.

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

Although DOE has routinely accepted public comment submissions through a variety of mechanisms, including postal mail and hand delivery/courier, the Department has found it necessary to make temporary modifications to the comment submission process in light of the ongoing Covid-19 pandemic. DOE is currently suspending receipt of public comments via postal mail and hand delivery/courier. If a commenter finds that this change poses an undue hardship, please contact Appliance Standards Program staff at (202) 586-1445 to discuss the need for alternative arrangements. Once the Covid-19 pandemic health emergency is resolved, DOE anticipates resuming all of its regular options for public comment submission, including postal mail and hand delivery/courier.

Docket: The docket for this activity, which includes *Federal Register* notices, comments, and other supporting documents/materials, is available for review at *https://www.regulations.gov*. All documents in the docket are listed in the *https://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 webpage can be found at: *http://www.regulations.gov/docket/EERE-2021-BT-STD-0018*. The docket webpage contains instructions on how to access all documents, including public comments, in the docket. See section III for information on how to submit comments through *https://www.regulations.gov*.

FOR FURTHER INFORMATION CONTACT:

Mr. Jeremy Dommu, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, EE-5B, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Telephone: (202) 586-9870. E-mail: *ApplianceStandardsQuestions@ee.doe.gov*.

Mr. 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 or review other public comments and the docket, contact the Appliance and Equipment Standards Program staff at (202) 287-1445 or by e-mail: *ApplianceStandardsQuestions@ee.doe.gov*.

SUPPLEMENTARY INFORMATION:

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I. Introduction

DOE has established an early assessment review process to conduct a more focused analysis to evaluate, based on statutory criteria, whether a new or amended energy conservation standard is warranted. Based on the information received in response to the RFI and DOE's own

analysis, DOE will determine whether to proceed with a rulemaking for a new or amended energy conservation standard. If DOE makes an initial determination that a new or amended energy conservation standard would satisfy the applicable statutory criteria or DOE's analysis is inconclusive, DOE would undertake the preliminary stages of a rulemaking to issue a new or amended energy conservation standard. If DOE makes an initial determination based upon available evidence that a new or amended energy conservation standard would not meet the applicable statutory criteria, DOE would engage in notice and comment rulemaking before issuing a final determination that new or amended energy conservation standards are not warranted.

A. Authority

The Energy Policy and Conservation Act, as amended ("EPCA"),[1] among other things, authorizes DOE to regulate the energy efficiency of a number of consumer products and certain industrial equipment. (42 U.S.C. 6291-6317) Title III, Part C[2] of EPCA, added by Public Law 95-619, Title IV, section 441(a) (42 U.S.C. 6311-6317, as codified), established the Energy Conservation Program for Certain Industrial Equipment, which sets forth a variety of provisions designed to improve energy efficiency. This equipment includes pumps, the subject of this document. (42 U.S.C. 6311(1)(A))

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 EPCA include definitions (42 U.S.C. 6311), test procedures (42 U.S.C. 6314), labeling provisions (42 U.S.C. 6315), energy conservation

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[1] All references to EPCA in this document refer to the statute as amended through the Energy Act of 2020, Public Law 116-260 (Dec. 27, 2020).

[2] For editorial reasons, upon codification in the U.S. Code, Part C was redesignated Part A-1.

standards (42 U.S.C. 6313), and the authority to require information and reports from manufacturers (42 U.S.C. 6316).

Federal energy efficiency requirements for covered equipment established under EPCA generally supersede State laws and regulations concerning energy conservation testing, labeling, and standards. (42 U.S.C. 6316(a) and (b); 42 U.S.C. 6297) DOE may, however, grant waivers of federal preemption in limited instances for particular state laws or regulations, in accordance with the procedures and other provisions set forth under 42 U.S.C. 6316(a) (applying the preemption waiver provisions of 42 U.S.C. 6297).

DOE must follow specific statutory criteria for prescribing new or amended standards for covered equipment. EPCA requires that any new or amended energy conservation standard prescribed by the Secretary of Energy ("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)). The Secretary may not prescribe an amended or new standard that will not result in significant conservation of energy, or is not technologically feasible or economically justified. (42 U.S.C. 6316(a); 42 U.S.C. 6295(o)(3))

EPCA also 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 notice of proposed rulemaking ("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))

B. Rulemaking History

DOE published a framework document for pumps on January 25, 2013. 78 FR 7304. This document described the procedural and analytical approaches DOE anticipated using to evaluate potential new energy conservation standards for pumps. DOE solicited comment on this document and invited stakeholders to a public meeting to discuss the document.

A commercial and industrial pumps working group ("CIP working group") was established in 2013 under the Appliance Standards and Rulemaking Advisory Committee ("ASRAC") in accordance with the Federal Advisory Committee Act and the Negotiated Rulemaking Act. (5 U.S.C. App.; 5 U.S.C. 561–570). See also 78 FR 44036. The purpose of the CIP working group was to discuss and, if possible, reach consensus on proposed standards for pump energy efficiency. On June 19, 2014, the CIP working group reached consensus on proposed energy conservation standards for specific rotodynamic, clean water pumps[3] used in a variety of commercial, industrial, agricultural, and municipal applications. The CIP working group assembled their recommendations into a Term Sheet (See Docket EERE-2013-BT-NOC-0039-0092).[4]

The Term Sheet contained recommendations on the definitions relevant to all pumps, the scope for commercial and industrial pumps, energy conservation standards for pumps within scope, and the test metric for commercial and industrial pumps. Consequently, DOE initiated both an energy conservation standards rulemaking and a test procedure rulemaking to implement these recommendations.

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[3] Clean water pumps are designed for pumping water with a maximum non-absorbent free solid content of 0.016 pounds per cubic foot, with a maximum dissolved solid content of 3.1 pounds per cubic foot, provided that the total gas content of the water does not exceed the saturation volume, and disregarding any additives necessary to maintain the water above 14°F.

[4] CIP working group Term Sheet, *https://www.regulations.gov/document/EERE-2013-BT-NOC-0039-0092.*

On January 26, 2016, DOE published a final rule adopting energy conservation standards for commercial and industrial pumps manufactured on or after January 27, 2020. 81 FR 4368 ("January 2016 ECS Final Rule"). The energy conservation standards established in the January 2016 ECS Final Rule were consistent with those recommended by the CIP working group and approved by ASRAC. 81 FR 4368, 4375. The current energy conservation standards for pumps are codified at 10 CFR 431.465. Additionally, DOE established a test procedure for determining pump energy efficiency published in a Final Rule on January 25, 2016. 81 FR 4086 ("January 2016 TP Final Rule").[5] The current test procedures for pumps are codified at 10 CFR 431.464 and in Appendix A to Subpart Y of 10 CFR part 431 ("Appendix A").

II. Request for Information

DOE is publishing this RFI to collect data and information during the early assessment review process to inform its decision, consistent with its obligations under EPCA, as to whether the Department should proceed with an energy conservation standards rulemaking. Below DOE has identified certain topics for which information and data are requested to assist in the evaluation of the potential for amended energy conservation standards. DOE also welcomes comments on other issues relevant to its early assessment that may not specifically be identified in this document.

A. Scope and Equipment Classes

This RFI covers equipment meeting the pump definition codified in 10 CFR 431.462. "Pump" means equipment designed to move liquids (which may include entrained gases, free solids, and totally dissolved solids) by physical or mechanical action and includes a bare pump[6]

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[5] On March 23, 2016, DOE published a correction to the January 2016 ECS Final Rule to correct the placement of the product-specific enforcement provisions related to pumps under 10 CFR 429.134 at paragraph (i). 81 FR 15426.

[6] A "bare pump" is exclusive of mechanical equipment, driver, and controls. See 10 CFR 431.462.

and, if included by the manufacturer at the time of sale, mechanical equipment,[7] driver,[8] and controls.[9] 10 CFR 431.462.

As part of the January 2016 ECS Final Rule, DOE established energy conservation standards for five categories of clean water pumps: end suction close-coupled ("ESCC"); end suction frame mounted/own bearings ("ESFM"); in-line ("IL"); radially split, multi-stage, vertical, in-line diffuser casing ("RSV"); and submersible turbine ("ST") pumps. 10 CFR 431.464(a)(1)(i). Each of these categories is limited to pumps that have a shaft input power greater than or equal to 1 horsepower ("hp") and less than or equal to 200 hp at the best efficiency point ("BEP")[10] and full impeller diameter. DOE defines each of these categories in 10 CFR 431.462. DOE provides additional specifications regarding the applicability of the test procedure, and therefore the energy conservation standards, at 10 CFR 431.464(a)(ii).[11]

Pumps are further delineated into equipment classes based on nominal speed of rotation and operating mode. 10 CFR 431.465. All pump equipment classes are summarized in Table II.1.

Table II.1 Equipment Classes for Pumps

Basic Pump Equipment Category	Nominal Driver Speed (rpm)	Constant or Variable Load (CL or VL)	Equipment Class
ESCC	1,800	CL	ESCC.1800.CL
	3,600	CL	ESCC.3600.CL
	1,800	VL	ESCC.1800.VL
	3,600	VL	ESCC.3600.VL
ESFM	1,800	CL	ESFM.1800.CL
	3,600	CL	ESFM.3600.CL
	1,800	VL	ESFM.1800.VL
	3,600	VL	ESFM.3600.VL
IL	1,800	CL	IL.1800.CL
	3,600	CL	IL.3600.CL
	1,800	VL	IL.1800.VL
	3,600	VL	IL.3600.VL
RSV	1,800	CL	RSV.1800.CL

[7] "Mechanical equipment" is any component of a pump that transfers energy from the driver to the bare pump. See 10 CFR 431.462.

[8] A "driver" provides mechanical input to drive a bare pump directly or through the use of mechanical equipment. Electric motors, internal combustion engines, and gas/steam turbines are examples of drivers. See 10 CFR 431.462

[9] A "control" is used to operate a driver. See 10 CFR 431.462.

[10] Best efficiency point ("BEP") is the pump hydraulic power operating point consisting of both flow and head conditions of a pump that results in the maximum efficiency. See 10 CFR 431.462.

[11] The test procedure applies to the established categories of pumps that have the following characteristics: (a) Flow rate of 25 gallons per minute (gpm) or greater at BEP and full impeller diameter; (b) Maximum head of 459 feet at BEP and full impeller diameter and the number of stages required for testing (see section 1.2.2 of appendix A of this subpart); (c) Design temperature range 34 to 248 °F; (d) Designed to operate with either: (1) A 2-pole induction motor; or (2) A non-induction motor with a speed of rotation operating range that includes speeds of rotation between 2,880 and 4,320 revolutions per minute (rpm) and/or 1,440 and 2,160 rpm, and in either case, the driver and impeller must rotate at the same speed; (e) For ST pumps, a 6-inch or smaller bowl diameter; and (f) For ESCC and ESFM pumps, a specific speed less than or equal to 5,000 when calculated using U.S. customary units. 10 CFR 431.464(a)(ii).

	3,600	CL	RSV.3600.CL
	1,800	VL	RSV.1800.VL
	3,600	VL	RSV.3600.VL
ST	1,800	CL	ST.1800.CL
	3,600	CL	ST.3600.CL
	1,800	VL	ST.1800.VL
	3,600	VL	ST.3600.VL

In a test procedure RFI published on April 16, 2021, DOE requested comment on whether it should expand or remove some of the limitations in 10 CFR 431.464(a)(ii) for pumps. 86 FR 20075.

In developing its recommendations, and in consideration of time constraints, the CIP working group further limited its scope to clean water pumps. (Term Sheet, recommendation #8). The CIP working group also recommended that pump energy efficiency standards not apply to (1) fire pumps, (2) self-priming pumps, (3) prime-assist pumps, (4) magnet driven pumps, (5) pumps designed to be used in nuclear facilities, and (6) pumps meeting design and construction requirements in various military specifications. *Id.* Consistent with the CIP working group recommendations, DOE established energy conservation standards for clean water pumps (10 CFR 431.465(b)(2)) and excluded from the scope of the energy conservation standards the pumps listed above (10 CFR 431.465(c)). Additionally, consistent with the recommendation from the CIP working group (See Term Sheet, recommendation #6), DOE excluded from coverage under the standards positive displacement pumps, axial/mixed flow pumps, double suction pumps, multistage axially split pumps, multistage radial-split horizontal pumps, multistage radial split vertical immersible pumps, and vertical turbine (non-submersible) pumps. 81 FR 4368, 4376.

Issue 1: DOE seeks comment on whether to consider energy conservation standards for pumps other than clean water pumps. Additionally, DOE seeks comment on whether energy conservation standards should be considered for positive displacement, axial/mixed flow, double suction, multistage axially split, multistage radial-split horizontal, multistage radial split vertical immersible, or non-submersible vertical turbine pumps, fire pumps, self-priming pumps, prime-assist pumps, magnet driven pumps, pumps used in nuclear facilities, or pumps specified for certain military uses. Specifically, DOE is interested in information and data on the industries in which these pumps are typically used, shipment data for these products (or the relative shipments for these products compared to clean water pumps currently with the scope of DOE's efficiency standards), and additional safety or performance standards that these pump types must meet.

B. Significant Savings of Energy

The January 2016 ECS Final Rule estimated that the established energy conservation standard for pumps would result in 0.10 quadrillion British thermal units ("quads") of site energy savings in site energy use over a 30-year period. 81 FR 4368, 4371. Additionally, in the January 2016 ECS Final Rule, DOE estimated that an energy conservation standard established at an energy efficiency level equivalent to that achieved using the maximum available technology ("max-tech") would have resulted in 0.38 additional quads of site energy savings. 81 FR 4368, 4415.

As a preliminary step in evaluating potential energy savings, DOE updated its energy savings estimates from the January 2016 ECS Final Rule. DOE's current estimate indicates that an amended energy conservation standard established at the same max-tech as the January 2016

ECS Final Rule would result in 0.25 quads of site energy savings (0.69 quads of full-fuel cycle energy savings) which is a reduction from 0.38 quads. The primary driver for the reduced estimate is a revised estimate of the base case efficiency distribution. In preparation for this RFI, DOE reviewed its Compliance Certification database[12] and found that the efficiency distribution by basic model in the marketplace in 2020 exceeded that assumed in the January 2016 ECS Final Rule for the adopted standard level (i.e., there are fewer models at baseline[13], indicating that manufacturers redesigned pump models to surpass, rather than just meet, the current Federal standard).[14]

While DOE's request for information is not limited to the following issues, DOE is particularly interested in comment, information, and data on the following topics to inform whether potential amended energy conservation standards would result in a significant savings of energy.

1. Base Case Efficiency Distribution

DOE uses base case efficiency distributions to calculate life cycle cost ("LCC") savings resulting from each considered energy efficiency level. In the analysis supporting the January 2016 ECS Final Rule, DOE developed the base case efficiency distributions based on the

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[12] U.S. Department of Energy's Compliance Certification Database, *https://www.regulations.doe.gov/certification-data/CCMS-4-Pumps_-_General_Pumps.html#q=Product_Group_s%3A%22Pumps%20-%20General%20Pumps%22*, Accessed February 24, 2020.

[13] The baseline efficiency level was set to represent the lowest efficiency hydraulic designs on the market. 81 FR 4368, 4382.

[14] While DOE does not have updated information on efficiency distribution by shipment as it did in the January 2016 ECS Final Rule, DOE compared the efficiency distributions by model and shipment gathered for the January 2016 ECS Final Rule and determined that model distribution is a reasonable proxy for shipment distribution.

shipments data provided by manufacturers[15] and used base case efficiency distribution specific to equipment class, shaft input power and flow.[16]

Issue 2: DOE seeks data and information on the distribution of pump efficiencies. To the extent available, DOE requests the data, in terms of pump energy index ("PEI"); by pump shipments at the equipment class level; and disaggregated by shaft input power and flow, for bare pumps only. DOE seeks comment on how the shipments efficiency distribution might differ across ranges of flow and shaft input power for each equipment class.

2. Energy Use

Consumer inputs to the energy use analysis are based on operational demands that are independent of the pump efficiency, while equipment inputs to the analysis are based on the efficiency of the pump. Consumer inputs include consumer duty point that is defined by the flow and head, annual load profile, and annual operating hours. With limited data available with respect to the duty point in the January 2016 ECS Final Rule analysis, DOE developed a distribution of duty points (i.e., operating shaft input power and flow) based on shipments data provided by manufacturers. DOE developed four representative load profiles, characterized by different weights at 50 percent, 75 percent, 100 percent, and 110 percent of the flow at the duty point. The load profiles were developed to represent a range of pump loading conditions within an annual cycle. For the January 2016 ECS Final Rule, DOE estimated statistical distributions

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[15] DOE's shipment estimates for the January 2016 ECS Final Rule (and carried through to the updated energy savings estimate presented in this section) relied on annual shipments data for 2012 provided by industry. 81 FR 4368, 4391. See discussion in the January 2016 ECS Final Rule Technical Support Document ("TSD"), Section 8.3.3 of Chapter 8, available at *https://www.regulations.gov/document/EERE-2011-BT-STD-0031-0056*.

[16] In the January 2016 ECS Final Rule, DOE used performance data for bare pumps to represent the performance of all pump equipment classes. 81 FR 4368, 4382. In addition, DOE considered improved hydraulic design to be the only technology option suitable for further consideration in a standards rulemaking. 81 FR 4368, 4383-4384.

and average values of annual operating hours by application based on inputs from a subject matter expert and feedback from the CIP working group. In addition, in the January 2016 ECS Final Rule, DOE sized the pumps to operate within 75 percent to 110 percent of their BEP flow. 81 FR 4368, 4390.

Issue 3: DOE requests data and information on whether, and if so, how, the field energy use of pumps has changed since the January 2016 ECS Final Rule. Specifically, DOE is interested in any information and data related to whether there have been changes in duty points (i.e., flow, head, and shaft input power required for a given application), annual hours of operation, and load profiles since the January 2016 ECS Final Rule.

Issue 4: DOE requests comment on whether the characterization of pump sizing practices in the January 2016 ECS Final Rule remains appropriate. If not, DOE requests data and information on how pump sizing practices have changed since the January 2016 ECS Final Rule.

3. National Energy Savings

In the January 2016 ECS Final Rule shipments analysis, DOE developed shipment projections for pumps and, in turn, calculated equipment stock from 2020 through 2049, starting with the 2012 shipment estimates from the Hydraulics Institute ("HI") (Docket EERE-2013-BT-NOC-0039-0068). To project shipments of pumps, DOE relied primarily on Annual Energy Outlook 2014 forecasts. DOE used the shipments projection and the equipment stock to determine the National Energy Savings ("NES").

Issue 5: DOE requests 2020 (or the most recent year available) annual sales data (*i.e.*, number of shipments) for pumps by equipment class ,as shown in 10 CFR

431.465(b)(4). If disaggregated fractions of annual sales are not available at the equipment class level, DOE requests more aggregated fractions of annual sales at the category level (*i.e.*, ESCC, ESFM, IL, RSV, ST). If available, DOE requests annual sales data by equipment class for the previous five years (2015-2019).

C. Technological Feasibility

During the January 2016 ECS Final Rule, DOE considered a number of technology options that manufacturers could use to reduce energy consumption in pumps. 81 FR 4368, 4383. DOE seeks comment on any changes to these technology options that could affect whether DOE could propose a "no-new-standards" determination, such as an insignificant increase in the range of efficiencies and performance characteristics of these technologies.

While DOE's request for information is not limited to the following issues, DOE is particularly interested in comment, information, and data on the following.

1. Technology Options

A complete list of technology options evaluated for pumps in preparation for the January 2016 ECS Final Rule is presented in Table II.2. 81 FR 4368, 4383.

Table II.2 Pumps Technology Options Considered for the January 2016 ECS Final Rule

Technology Options
Improved Hydraulic Design
Improved surface finish on wetted components
Reduced running clearances
Reduced mechanical friction in seals
Reduction of other volumetric losses
Addition of variable speed drive ("VSD")

Improvement of VSD efficiency
Reduced VSD standby and off mode power usage

In the January 2016 ECS Final Rule, DOE determined that most of the technology options listed in Table II.2 had limited potential to improve pump efficiency. 81 FR 4368, 4383. Specifically, DOE received manufacturer feedback that certain technologies (a) did not significantly improve efficiency; (b) were not applicable to the equipment for which standards were being considered; (c) did not significantly improve efficiency across the entire scope of each equipment class; or (d) benefits degraded quickly over time. *Id.*

Table II.3 summarizes the pump technology options that DOE screened from its analysis in the January 2016 ECS Final Rule, and the applicable screening criteria.

Table II.3 Pumps Technology Options Screened from the January 2016 ECS Final Rule

	EPCA Criteria				
Screened Technology Option	**Technological Feasibility**	**Practicability to Manufacture, Install, and Service**	**Adverse Impact on Product Utility or Availability**	**Adverse Impacts on Health and Safety**	**Other Reasons for not Considering the Technology**
Improved surface finish on wetted components – smoothing operations		X			X*
Improved surface finish on wetted components – coating or plating			X		X*
Improved surface finish on wetted components – casting					X††
Reduced running clearances	X				X†, X††
Reduced mechanical friction in seals					X†, X*
Reduction of other volumetric losses			X		
Addition of variable speed drive					X*
Improvement of VSD efficiency					X*

Reduced VSD standby and off mode power usage					X*

*DOE screened out these technology options because they were not applicable to the equipment for which standards were being considered or did not significantly improve efficiency across the entire scope of each equipment class.
† DOE screened out these technology options because they did not significantly improve efficiency.
†† DOE screened out these technology options because efficiency improvements from these technologies degrade quickly.

Ultimately, hydraulic redesign was the only design option incorporated into the January 2016 ECS Final Rule engineering analysis. 81 FR 4368, 4385. Hydraulic redesign is a broad term used to describe the system design of a bare pump's wetted components. Although hydraulic redesign focuses on the specific hydraulic characteristics of the impeller and the volute/casing, it also includes design choices related to clearances, seals, and other volumetric losses.[17]

Issue 6: DOE seeks comment on if there are additional technology options that were not considered during the January 2016 ECS Final Rule that may have a significant potential for improving pump energy use beyond hydraulic redesign. Additionally, DOE requests feedback on whether, and if so, how, technologically feasible design options might vary by equipment class. DOE also seeks comment on how any of the listed technologies in Table II.3 may have changed since the January 2016 ECS Final Rule. Specifically, DOE is interested in data that support whether DOE should continue to screen-out the technologies listed in Table II.3 from its engineering analysis.

[17] See Section 3.6.1 Chapter 3 of the TSD for the January 2016 ECS Final Rule. Docket EERE-2011-BT-STD-0031-0056.

2. Representative Units

In the January 2016 ECS Final Rule, DOE identified representative configurations that were based on typical product offerings for each of the five equipment classes. 81 FR 4368, 4385. For the ESCC, ESFM, and IL equipment classes, the representative configuration was a pump fitted with a cast bronze impeller, a cast-iron volute and a mechanical seal. *Id*. For RSV and ST equipment classes, the representative configuration was a pump fitted with sheet metal-based fabricated stainless-steel impeller(s), and sheet metal-based fabricated stainless-steel casing and internal static components. *Id*. DOE is aware that many manufacturers redesigned their pump models in order to meet the standards set forth in the January 2016 ECS Final Rule (see discussion in Section II.B).

> *Issue 7:* DOE seeks comment on whether the representative configurations used in the January 2016 ECS Final Rule analysis for ESCC, ESFM, and IL pump impeller, volute and mechanical seal, and for RSV and ST impeller and bowl/casing continue to provide an accurate representation of the current market.

3. Efficiency Levels

DOE uses a standardized, minimally compliant bare pump, inclusive of a minimally compliant motor, as a reference pump. The efficiency of the minimally compliant pump is defined as a function of certain physical properties of the bare pump, such as flow at BEP and specific speed.[18] Section II.B.1.1.1 of Appendix A. The terms in the efficiency model (*i.e.,* BEP flow rate at full impeller diameter and nominal speed of rotation, specific speed) can be measured or calculated using the physical properties of the pump, except for the "C-value". The

[18] Section II of Appendix A prescribes how to compare a tested pump to the standard minimally compliant bare pump for each equipment class.

"C-value" is a constant based on the speed of rotation and equipment category of the pump model. 81 FR 4368, 4377 - 4378.

This pump hydraulic efficiency model is an adaptation of the European Union's ("EU") model equation,[19] modified to use United States customary units and 60 Hz electrical input power. 81 FR 4368, 4377. DOE defined pump efficiency levels using efficiency percentile ranges. *Id*. As an example, at the 25th percentile, 25 percent of pump models are less efficient than the defined efficiency model.[20]

The C-values specified in 10 CFR 431.465 correspond to the lower 25th percentile of efficiency for the ESCC, ESFM and IL equipment classes. 81 FR 4368, 4370. For the ST equipment classes, C-values for pumps at 3600 rpm correspond to the lower 25th percentile of efficiency, while C-values for pumps at 1800 rpm represent the baseline efficiency evaluated for the January 2016 ECS Final Rule. *Id*. Due to a lack of available data for ST pumps at 1800 rpm, DOE used data from the ST 3600 rpm analysis to set the C-value standard for ST pumps at 1800 rpm. 81 FR 4368, 4382. Ultimately, the standard for ST pumps at 1800 rpm was set to the baseline efficiency C-value established for ST pumps at 3600 rpm. *Id*. Because of a lack of available data for all RSV pumps, DOE harmonized the C-values for the RSV equipment classes with the EU 40th percentile value. 81 FR 4368, 4370.

Issue 8: DOE requests data for all pump equipment classes that would enable DOE to conduct an efficiency level analysis similar to that conducted for the January

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[19] Council of the European Union. 2012. Commission Regulation (EU) No 547/2012 of 25 June 2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for water pumps. Official Journal of the European Union. L 165, 26 June 2012, pp. 28-36.

[20] See Section 5.8.1 of Chapter 5 of the TSD for the January 2016 ECS Final Rule. Docket EERE-2011-BT-STD-0031-0056 p. 5-13.

2016 ECS Final Rule. To the extent available, DOE requests data grouped by equipment class and shaft power, and that includes pump energy rating ("PER"), pump hydraulic efficiency at BEP, specific speed at 60 Hz, and the BEP flow rate at full impeller diameter and nominal speed of rotation. If these data are not available, DOE requests test data that would allow for the calculation of these values according to Appendix A (*e.g.,* pump hydraulic efficiency at BEP can be calculated from bare pump PER at constant load, bare pump hydraulic output power and part load motor losses at 75 percent, 100 percent, and 110 percent of BEP flow[21]).

In its analysis supporting the January 2016 ECS Final Rule, DOE assigned the max-tech efficiency level as the maximum available efficiency already offered in the marketplace. DOE established a max-tech level at the 70th efficiency percentile for all equipment classes. 81 FR 4368, 4386. At this max-tech level there were existing pumps available in the market that met this level for all shaft powers between 1 and 200 hp. 81 FR 4368, 4386. However, the opportunity for efficiency improvement is not equal across the entire range of shaft powers, specifically, DOE's analysis supporting the January 2016 ECS Final Rule indicated that application of the design options listed in Table II.2 resulted in greater efficiency improvement for smaller pumps compared to larger pumps.[22]

Issue 9: DOE requests information on whether conducting a max-tech analysis based on size (for example, developing small and large shaft power

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[21] As described in sections II.E and II.B of Appendix A.

[22] See Section 3 of Chapter 3.6 of the TSD for the January 2016 ECS Final Rule. Docket EERE-2011-BT-STD-0031-0056 p. 5-13.

designations) or specific speed would be more representative of the pumps market and provide an opportunity for additional energy savings.

D. Economic Justification

In determining whether a proposed energy conservation standard is economically justified, DOE analyzes, among other things, the potential economic impact on consumers, manufacturers, and the Nation. DOE seeks comment on whether there are economic barriers to the adoption of more-stringent energy conservation standards. DOE also seeks comment and data on any aspects of its economic justification analysis from the January 2016 ECS Final Rule that may indicate whether a more-stringent energy conservation standard would be economically justified or cost effective.

While DOE's request for information is not limited to the following issues, DOE is particularly interested in comment, information, and data on the following.

1. Distribution Channels

In generating end-user price inputs for the LCC analysis and the National Impacts Analysis ("NIA"), DOE identified distribution channels (*i.e.*, how the equipment are distributed from the manufacturer to the consumer), and estimated relative sales volumes through each channel. Table II.5 presents the distribution channels identified by the CIP working group with their corresponding share of total pump sales that were used in the January 2016 ECS Final Rule analysis. 81 FR 4368, 4389.

Table II.5 Distribution Channels Market Shares for Pumps

Distribution Channel	Percentage of Total Pump Sales
Manufacturer to distributor to contractor to end-user	70%
Manufacturer to distributor to end-users	17%
Manufacturer to original	8%

equipment manufacturer to end-users	
Manufacturer to end-users	2%
Manufacturer to contractor to end-users	1%
Other	2%

Issue 10: DOE seeks input on whether the distribution channels described, and the percentage of shipments in each channel, as shown in Table II.5, reflect the current market.

2. Life-Cycle Cost and Payback Period Analysis

In the January 2016 ECS Final Rule analysis, DOE conducted a LCC and payback period ("PBP") analysis to estimate the economic impacts of potential new standards on individual consumers of pump equipment. The analysis included, among others, the inputs further elaborated below.

a. Installation, Repair and Maintenance Costs

In generating end-user price inputs for the LCC analysis and NIA in the January 2016 ECS Final Rule, DOE assumed that installation, maintenance, and repair costs remain identical across efficiency levels. With the market efficiency moving beyond what was projected in the January 2016 ECS Final Rule, there may be additional or different data available to represent the relationship between installation, repair, and maintenance costs and efficiency.

Issue 11: DOE requests feedback and data on whether installation costs at higher efficiency levels differ in comparison to baseline installation costs. To the extent that these costs differ, DOE seeks supporting data and the reasons for those differences.

Issue 12: DOE requests feedback and data on whether repair and maintenance costs at higher efficiency levels differ in comparison to repair and maintenance costs at baseline levels, respectively, both in terms of value and frequency of occurrence during the equipment lifetime. To the extent that these costs differ, DOE seeks supporting data and the reasons for those differences.

b. Equipment Lifetimes

The lifetime energy use of a pump is calculated as the annual energy use multiplied by the equipment economic lifetime. DOE considers economic lifetime, also called service lifetime, as the total number of years that the equipment is in service (from initial equipment installation until its final retirement), and the mechanical lifetime, as the total number of operating hours from initial equipment installation until its final retirement. In the January 2016 ECS Final Rule, DOE estimated the pump equipment lifetimes to range between 4 and 40 years, with an average lifetime of 15 years across all equipment classes, based on estimates from market experts and input from the CIP working group. The analysis conducted for the January 2016 ECS Final Rule used Weibull lifetime distribution per equipment class, and included variability by pump rotation speed, and lifetime extensions through repairs.[23]

Issue 13: DOE requests comment and data on whether any market and technology changes since the January 2016 ECS Final Rule would affect its equipment lifetime estimates for pumps for which DOE currently has standards, and if so, how. DOE additionally requests equipment lifetime data for any pump types

[23] See Section 8.3.2.5 of Chapter 8 of the TSD for the January 2016 ECS Final Rule. Docket EERE-2011-BT-STD-0031-0056 p. 5-13.

discussed through Section II.A that are not currently subject to energy conservation standards.

III. Submission of Comments

DOE invites all interested parties to submit in writing by the date under the **DATES** heading, comments and information on matters addressed in this notification and on other matters relevant to DOE's early assessment of whether more-stringent energy conservation standards are warranted for pumps.

Submitting comments via https://www.regulations.gov. The *https://www.regulations.gov* webpage requires you to provide your name and contact information. Your contact information will be viewable to DOE Building Technologies 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. If this instruction is followed, 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 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)) to *https://www.regulations.gov*. Comments submitted through *https://www.regulations.gov* cannot be claimed as CBI. Comments received through the website will not be protected under CBI. For information on submitting CBI, see the Confidential Business Information section.

DOE processes submissions made through *https://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 is generated through *https://www.regulations.gov* after you have successfully uploaded your comment.

Submitting comments via email. Comments and documents submitted via email also will be posted to *https://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 in 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. Faxes will not 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 only unsecured documents 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. Pursuant 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 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. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

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 test procedures and energy conservation standards. DOE actively encourages the participation and interaction of the public during the comment period in each stage of this process. Interactions with and between members of the public provide a balanced discussion of the issues and assist DOE in the process. Anyone who wishes to be added to the DOE mailing list to receive future notices and information about this process should contact Appliance and

Equipment Standards Program staff at (202) 287-1445 or via e-mail at *ApplianceStandardsQuestions@ee.doe.gov*.

Signing Authority

This document of the Department of Energy was signed on August 2, 2021, by Kelly Speakes-Backman, Principal Deputy Assistant Secretary and Acting Assistant Secretary for Energy Efficiency and Renewable Energy, pursuant to delegated authority from the Secretary of Energy. That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document upon publication in the *Federal Register*.

Signed in Washington, DC, on August 4, 2021.

Treena V. Garrett,

Federal Register Liaison Officer,

U.S. Department of Energy.

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