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SUMMARY

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The Department of Energy's Appliance and Equipment Standards Program: Prioritization Options for Addressing the Rulemaking Backlog

Since its inception, the Department of Energy (DOE) has administered programs for reducing energy consumption by influencing consumer choice and improving technology. Starting in 1975, Congress authorized programs to address the energy and water consumption of consumer products, such as appliances, and commercial and industrial equipment used in buildings. In 1978, Congress authorized a mandatory national standards program having binding targets and timetables for the energy performance and energy consumption of appliances and, in the Energy Policy Act of 1992 (P.L. 102-486), for commercial and industrial equipment ("products and equipment").

Early in the national standards program, Congress required DOE to revise certain standards according to a set schedule, often specific to the product or equipment. Congress later required DOE to conduct an every-six-year review of efficiency standards for products and equipment in the Energy Independence and Security Act of 2007 (P.L. 110-140). Subsequent Congressional action, the American Energy Manufacturing Technical Corrections Act (P.L. 112-210) clarified this requirement for certain commercial and industrial equipment. DOE has accumulated a backlog of standards due for revision, and in its August 2021 Report to Congress on the national standards program tallied 33 rulemakings that were late relative to a statutory deadline.

DOE has previously set polices and used criteria on whether to issue new and revised standards. These would have reduced the number of rulemakings by applying a threshold of energy savings or would have sequenced the rulemakings according to a set of criteria. Most recently, in 2020, DOE issued a policy to apply a quantitative threshold, believing it would "eliminate from further consideration those potential standards that are projected to result in substantially lower energy savings." The policy was reversed in the Biden administration.

In addition to reducing the backlog of rulemakings, sequencing rulemakings would realize the benefits of significant conservation of energy as soon as possible. Delaying revisions delays the energy savings that would accrue under a newly revised rule, which by law must be more stringent. Performing the most effective rulemakings first would capture the largest benefits sooner.

Any method that reduces the number of rulemakings will have some consequences. A CRS analysis shows that, had DOE applied the energy threshold it established in 2020 during the years 2013 to 2017, it would have not promulgated 14 rulemakings. Doing so would have foregone 1.625 quadrillion British thermal units (Btu) of energy savings, or about 1.5% of annual consumption in the United States.

Congress has options that would help DOE reduce the backlog. First, Congress may wish to prioritize revisions with significant conservation of energy by specifying a minimum quantity or percent of energy saved, instructing DOE to test any potential revision against this minimum. If the minimum is not met, Congress could instruct DOE not to proceed with revising a standard. This would likely reduce the number of revisions DOE must complete. Second, Congress could require DOE to conduct a periodic study of the impacts of many standards. Such a study could determine the expected energy savings of the standards, and DOE could use these insights to prioritize those standards for which it estimates the highest conservation of energy. Third, Congress may wish to require DOE to prepare a report assessing the energy efficiency potential, or how much energy could be saved both by setting more stringent standards and including additional appliances and equipment in the national standards program. This could cover consumer products and commercial equipment of any type, not just those currently regulated by DOE and thus might capture additional opportunities for energy savings. There may be other options that do not involve changing how DOE sets its priorities, not analyzed here, including increasing the number of staff available with an aim toward clearing the backlog faster. Congress could also allow the current approach to prevail. This would result in no additional administrative costs to the program. In addition, the current approach would capture more energy savings than the threshold approach, noted above, if such rulemakings were to be completed rather than remain in a backlogged state.

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Introduction

Since its inception, the Department of Energy (DOE) has administered programs aimed at reducing energy consumption by influencing consumer choice and improving technology. Reducing energy consumption can lead to a reduction in the impacts on human health and the environment because of the reduction in extraction of primary energy resources and their processing, conversion, delivery, and end use to provide energy services.[1] For the residential consumer or the firm, the use of both more efficient consumer products, such as household appliances, and commercial and industrial equipment, can lead to savings in monthly energy bills, which can lead to lower total cost of ownership.

Starting in 1975 Congress authorized programs to address the energy and water consumption of consumer products and commercial equipment used in buildings.[2] The program was first authorized with the Energy Policy and Conservation Act (EPCA, P.L. 94-163) and later amended by numerous acts.[3] In 1978, Congress authorized a mandatory national standards program and tasked the Secretary of Energy with setting binding targets and timetables for the energy performance of the consumer products used in buildings, provided those standards met certain statutory criteria.[4] One of these criteria is the admonition not to set a standard that does not achieve "significant conservation of energy"; however, EPCA, as amended, does not elaborate further on an explicit quantitative definition. DOE rulemakings and court cases have furthered debate about what comprises significant conservation of energy.

DOE administers the national standards program for more than 60 categories of products and equipment, and also issues test methods, conducts enforcement activities, oversees certification, and revises the standards themselves on a schedule set by Congress. Over the last several years, DOE has accumulated a backlog of standards due for revision but not yet completed on the schedule set by Congress. This backlog has been the subject of court cases and Congressional hearings.[5]

This report analyzes the history and status of the backlog of revisions to the national standards program. As stated in statute, the purpose of the national standards program is to "conserve nonrenewable energy resources";[6] the report does not conduct an independent assessment of this stated purpose. Through statute and later oversight hearings, Congress has indicated a preference for DOE to address the overdue revisions to the standards that accumulate in the backlog.[7] The

[1] National Research Council, *Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use*, Washington, DC, 2010.

[2] There are also several plumbing products regulated for water consumption that are not discussed in this report.

[3] 42 U.S.C. §§6291–6317. A longer list of the statutes amending EPCA may be found in Table 1 of CRS Report R47038, *The Department of Energy's Appliance and Equipment Standards Program*, by Martin C. Offutt.

[4] The Energy Policy Act of 1992 (EPAct92, P.L. 102-486) expanded the program to include commercial and industrial equipment.

[5] For example, a court case was State of New York et al. v. Bodman et al., No. 05-CV-7807 (S.D.N.Y. Sept. 7, 2005); a Congressional hearing was U.S. Congress, House Committee on Energy and Commerce, Subcommittee on Energy, "Wasted Energy: DOE's Inaction on Efficiency Standards and Its Impact on Consumers and the Climate," 116th Cong., 1st sess., March 4, 2019.

[6] Section 102(b) of the National Energy Conservation Policy Act (NECPA, P.L. 95-619).

[7] Section 141 of the Energy Policy Act of 2005 (EPAct05, P.L. 109-58) states that "The Secretary [of Energy] shall submit a report to Congress regarding each new or revised energy conservation or water use standard which the Secretary has failed to issue in conformance with the deadlines established in the Energy Policy and Conservation Act. Such report shall state the reasons why the Secretary has failed to comply with the deadline for issuances of the new or revised standard and set forth the Secretary's plan for expeditiously prescribing such new or revised standard." 42 U.S.C. §15834.

report discusses the current approach and also provides prioritization options for how to address the backlog, and analyzes what the effects of these options might be. The scope of these effects include the change in the quantity of energy conserved and changes in indicators not explicitly called for by the statute. There may be other options for clearing the backlog that do not involve prioritization, including increasing the number of staff available with an aim toward clearing the backlog faster, but these options are not discussed here except briefly. A further option is to continue with business as usual, which the report discusses in a later section, "Comparison to Current Approach."

This report is organized into sections discussing the national standards program; how DOE issues the standards; DOE's past attempts to prioritize the order in which it completes these standards; other possible methods of prioritizing; the effect of prioritization and its impacts; and, lastly, options for Congress.

DOE's National Standards Program

Overview

The Department of Energy has implemented the EPCA authority for over 60 categories of products and equipment to achieve energy conservation. Some of the better-known covered products and equipment include refrigerators, furnaces, and commercial air conditioning. The regulations also cover less visible equipment and equipment parts such as transformers and furnace fans. According to a 2017 DOE estimate, the program was expected to deliver energy savings of 71 quadrillion British thermal units (quads) from inception through 2020,[8] which is three-quarters of one year's primary energy production in the United States.[9]

How the Program Works[10]

The program sets minimum efficiency standards or maximum water[11] or energy use standards for both consumer products and commercial and industrial equipment ("products and equipment"); the standards that apply to these products and equipment are established by Congress in law or by the Secretary of Energy following EPCA. The effect of the standards regulations is to remove from the market those products and equipment that do not comply with the standard. The standards thus reduce the choice set a consumer or firm would face so that less energy-efficient and higher energy-consuming products are no longer part of that set.

The national standards program includes features to ensure compliance at the point a product leaves the manufacturer and well-defined test procedures to determine the energy consumption of the products and equipment. As with the energy conservation standards, the test procedures are codified in the *Code of Federal Regulations* (C.F.R.).

[8] See U.S. Department of Energy, Office of Buildings Technology, "History and Impacts: Buildings," at https://www.energy.gov/eere/buildings/history-and-impacts.

[9] U.S. Energy Information Administration, *U.S. Energy Facts Explained*, at https://www.eia.gov/energyexplained/us-energy-facts/.

[10] This section provides an overview of the program. Readers interested in a detailed description and analysis should consult CRS Report R47038, *The Department of Energy's Appliance and Equipment Standards Program*, by Martin C. Offutt.

[11] There are several plumbing products regulated for water consumption that are not discussed here.

DOE's analyses in support of the national standards program estimate the energy savings in units of quads. One quad is the combustion energy in roughly one trillion cubic feet (Tcf) of natural gas; the United States consumed roughly 30 Tcf of natural gas in 2021.[12] Annually, the United States consumes approximately 100 quads of energy from all sources.[13]

Statutory Requirements of the National Standards Program

The statute that authorizes the national standards program, the Energy Policy and Conservation Act, as amended, requires that new or amended standards must result in significant conservation of energy, be technologically feasible, and be economically justified.[14] EPCA is not specific on what comprises "significant conservation of energy," and DOE currently has no articulated position.[15]

For the "technologically feasible" criteria, EPCA requires, at the proposed rule stage, that the "Secretary [of Energy] shall determine the maximum improvement in energy efficiency or maximum reduction in energy use that is technologically feasible."[16]

In setting new or revised energy conservation standards, the Secretary of Energy considers the energy savings, cost (or savings) to consumers and firms, and cost (or savings) to the manufacturers as part of the determination whether "the benefits to the nation of the standards ... outweigh the burdens."[17] If the Secretary finds in the affirmative for a candidate standard, the Secretary issues that standard in regulation and places it in the C.F.R.

Six-Year Reviews

EPCA, as amended, requires DOE either to publish a determination that a standard does not need amending or issue a notice of proposed rulemaking for a newly-revised standard within six years of a previous final rule for a given product, piece of equipment, or class of either.[18] An example in which DOE opted to revise the standard was in the case of computer room air conditioners. DOE initiated the periodic review in 2019 with a request for information.[19] Later, in 2022, DOE issued a proposed rule.[20] DOE has stated that it typically needs at least three years to complete a rulemaking to revise an energy conservation standard.[21]

[12] Energy Information Administration, *Natural Gas Consumption by End Use*, March 31, 2022, at https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm.

[13] U.S. Energy Information Administration, *U.S. Energy Facts Explained*, at https://www.eia.gov/energyexplained/us-energy-facts/.

[14] This language may be found at 42 U.S.C. §6295(o)(3)(B) for consumer products and is conveyed to commercial and industrial equipment via a crosswalk provision at 42 U.S.C. §6316(a).

[15] See 85 *Federal Register* 50937 (August 19, 2020), which finalized a threshold of 0.3 quads, and 86 *Federal Register* 70892 (December 13, 2021) which subsequently removed that threshold.

[16] 42 U.S.C. §6316(a) and §6295(p)(1)).

[17] 81 *Federal Register* 1033 (January 8, 2016). This language occurs in numerous rulemakings.

[18] 42 U.S.C. §6295(m)(1) and 42 U.S.C. §6313(a). See discussion at 87 *Federal Register* 11651 (March 2, 2022).

[19] 84 *Federal Register* 48006 (September 11, 2019).

[20] 87 *Federal Register* 12802 (March 7, 2022).

[21] U.S. Congress, House Committee on Energy and Commerce, Subcommittee on Energy, Wasted Energy: DOE's Inaction on Efficiency Standards and Its Impact on Consumers and the Climate, testimony of Daniel Simmons, Assistant Secretary for Energy Efficiency and Renewable Energy, 116th Cong., 1st sess., March 7, 2019.

On a case-by-case basis, Congress has established schedules by which DOE must conduct periodic rulemakings. The Energy Independence and Security Act of 2007 (EISA 2007, P.L. 110-140), for example, set a number of milestones for rulemakings for general service lamps.[22] DOE later issued a final determination in 2019 that it would not revise standards for general service incandescent lamps.[23]

Promulgation of Standards

History of Initial Phase of Standards Program

The first set of binding standards provides an illustration of how over time DOE and/or Congress has revised the energy conservation standards. The national standards program began with a list of 13 product categories to be covered.[24] Generally speaking these were household appliances such as refrigerators. Congress tasked DOE with setting appropriate standards by rulemaking and also gave DOE the option to decline to set a standard if, in the Secretary's judgment, it failed to meet statutory criteria. In 1982 and 1983, DOE did in fact decline to set standards for eight of these 13 congressionally-authorized products after concluding by rulemaking that such standards would not achieve "significant conservation of energy."[25] This first use of the "significant conservation of energy" test was the subject of litigation a few years later, and the debate about its meaning continues.

With the National Appliance Energy Conservation Act of 1987 (NAECA, P.L. 100-12),[26] Congress enacted standards for 11 product categories into law.[27] Congress specified the quantitative standard and the date by which manufacturers were to comply.

Figure 1 shows the various product categories in a timeline, the earliest points of which correspond to the NAECA-specified standards. These energy conservation standards all took effect by 1992. Subsequent points in the timeline—an icon depicts each product category—show the revisions to the energy conservation standards. In some cases, Congress legislated the revisions; for example, EISA 2007 set the quantitative energy conservation standard for some products and equipment. In other instances, Congress left it to DOE to conduct a rulemaking to decide the quantitative level of the revised standard.

[22] See discussion at 84 *Federal Register* 71628 (December 27, 2019).

[23] 84 *Federal Register* 71626 (December 27, 2019).

[24] Although there were originally 13 categories of products, the number of these original 13 for which standards were to be issued was reduced to 11 after NAECA combined two categories to make one, "refrigerators and freezers," and deleted "humidifiers and dehumidifiers." Congress left it to DOE's discretion whether to issue standards for one of these, televisions, which it did not. See discussion at 52 *Federal Register* 46369 (December 7, 1987).

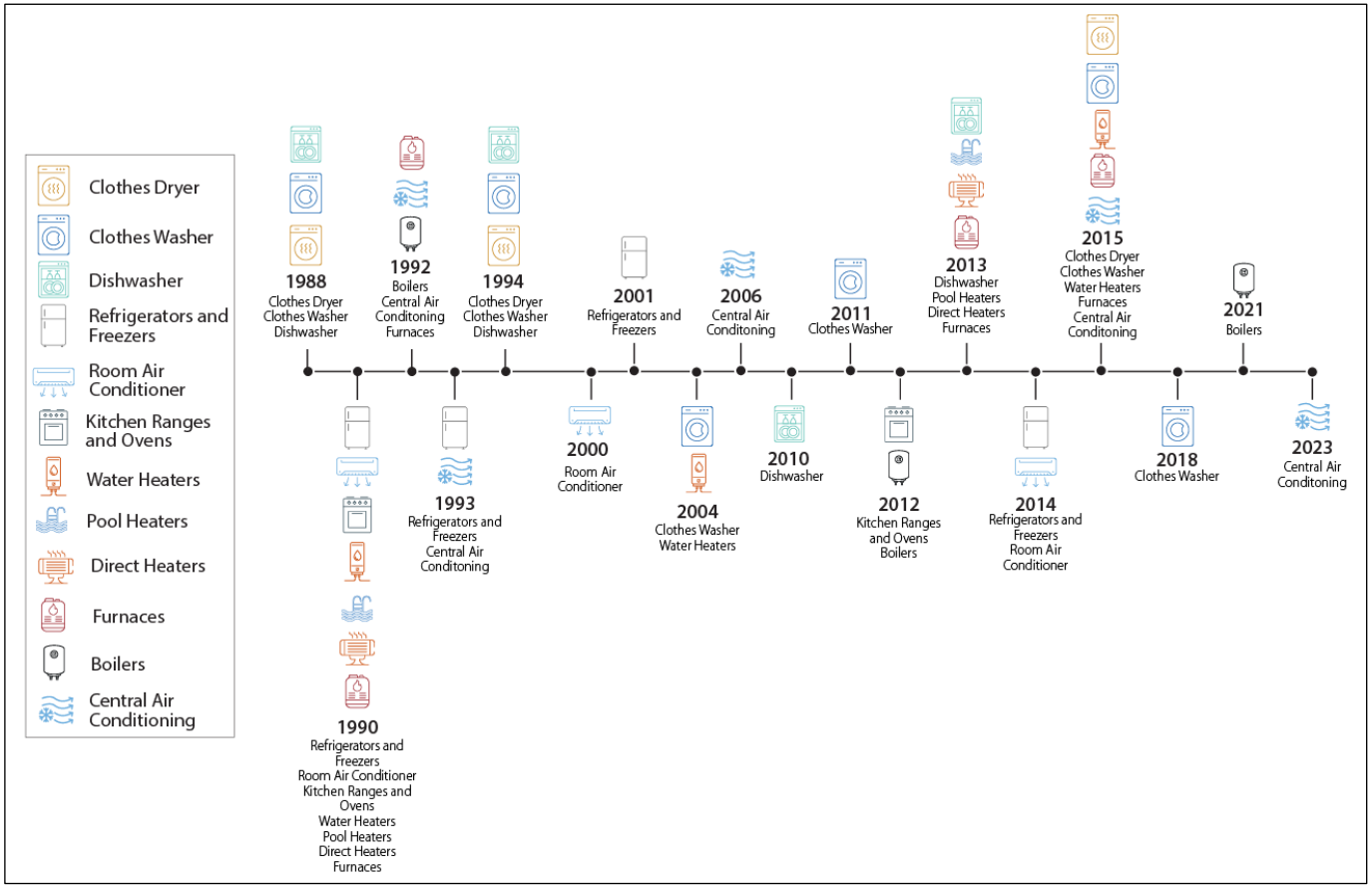
[25] 47 *Federal Register* 57198 (December 22, 1982) and 48 *Federal Register* 39376 (August 30, 1983).

[26] See Sections 322(a) and 325(a)(1) of EPCA.

[27] 42 U.S.C. §6292(a).

Figure 1. Compliance Date of New and Revised Appliance Energy Conservation Standards

Data are for the first appliance standards required as of 1987 by EPCA, as amended



Source: Compiled by CRS from *Federal Register* notices and from EPCA, as amended, including NAECA, EISA 2007, and the Energy Policy Act of 2005 (EPAct05, P.L. 109-58).

Notes: Although furnaces and boilers are considered together in law and regulation, there are distinct quantitative standards for each and are given here as separate icons.

Late Rulemakings

Three statutes—NAECA; the National Appliance Energy Conservation Amendments of 1988 (NAECA 1988, P.L. 100-357); and the Energy Policy Act of 1992 (EPAct92, P.L. 102-486)—required DOE to review specific standards by rulemaking at time intervals varying, case by case, from three to eight years later. DOE states that after EPAct92 the backlog of late rulemakings began to accumulate.[28]

Congress required DOE to make an initial report on late rulemakings per Section 141 of the Energy Policy Act of 2005 (EPAct05, P.L. 109-58). In the first such report, DOE noted that by 1997 it had missed 17 statutory deadlines for issuance of standards, a number that had increased to 25 by 2005.[29] Congress further required DOE to issue semi-annual reports until such time as the backlog was retired. DOE published the first report in January 2006 and established a schedule by which it planned to retire the backlog.[30] This schedule was in large part ratified later that year in a consolidated consent decree.[31]

By 2014, DOE was having to address the first cohort of standards that were due for six-year reviews. Section 305 of EISA 2007 had required DOE to conduct every-six-year reviews of consumer product and commercial and industrial equipment, and the American Energy Manufacturing Technical Corrections Act (AEMTCA, P.L. 112-210) clarified the timeline for certain commercial and industrial equipment standards.

The 2021 report to Congress indicates 33 rulemakings that were late relative to a statutory deadline.[32] (See **Figure 2**.) Of these, 25 had missed the every-six-year review deadline.

[28] U.S. Department of Energy, *Energy Conservation Standards Activities: Submitted Pursuant to Section 141 of the Energy Policy Act of 2005 and to the Conference Report (109-275) to the FY2006 Energy and Water Development Appropriations Act*, Washington, DC, January 2006, p. 33.

[29] Ibid., p. 34.

[30] U.S. Department of Energy, *Energy Conservation Standards Activities: Report to Congress*, Washington, DC, January 31, 2006. These reports were later combined with the semi-annual implementation reports required under Sections 305 and 321 of EISA 2007.

[31] State of New York, et al. v. Bodman No. 05-CV-7807 (S.D.N.Y. Sept. 7, 2005) and NRDC, Inc. et al. v. Bodman No. 05-Civ.-7808.

[32] U.S. Department of Energy, *Energy Conservation Standards Activities: Report to Congress*, Washington, DC, August 2021.

Figure 2. Status of the Rulemaking Backlog of Energy Conservation Standards Since 2013

Source: CRS analysis of DOE reports to Congress.

Notes: Reports from February 2013 to August 2014 did not provide a cumulative total, and, as a result, the top line, "rulemakings that have missed a statutory deadline," is truncated.

The Pace of Rulemakings

The pace at which the accumulated late rulemakings can be retired depends on DOE's capacity. At any given time, DOE has a large number of rulemakings in progress. In the *Spring 2022 Unified Agenda of Regulatory and Deregulatory Actions*,[33] DOE listed 20 energy conservation standards in the pre-rule phase, 46 in the proposed rule stage, and 6 in the final rule stage.[34]

Congress has taken note of the backlog. In March 2019 the House Energy and Commerce Committee, Subcommittee on Energy, held a hearing after DOE had missed the deadlines for completion of 16 of the every-six-year reviews, according to one estimate.[35] Four of the

[33] Office of Management and Budget, Office of Information and Regulatory Affairs, *Spring 2022 Unified Agenda of Regulatory and Deregulatory Actions*, June 2022, at https://www.reginfo.gov/public/do/eAgendaMain.

[34] The *Unified Agenda*, typically published twice per year, calls upon agencies to list their regulations under development. CRS In Focus IF12118, *The Unified Agenda of Federal Regulatory and Deregulatory Actions: An Overview*, by Maeve P. Carey. The Spring 2022 unified agenda was published in June 2022.

[35] U.S. Congress, House Committee on Energy and Commerce, Subcommittee on Energy, Memorandum on Hearing, "Wasted Energy: DOE's Inaction on Efficiency Standards and Its Impact on Consumers and the Climate," 116th Cong., 1st sess., March 4, 2019; Appliance Standards Awareness Project, *Missed Deadlines for Appliance Standards*, January

rulemakings accomplishing such reviews had been signed and dated in 2016 but not yet published.[36] A federal court ordered DOE to issue those rulemakings,[37] which DOE then promulgated in January 2020.[38] Nonetheless, the backlog of rulemakings persisted, as illustrated in **Figure 2**.

Summary of Current Approach

DOE's current approach is to maintain a list of rulemakings for energy conservation standards that are either due for revision soon or are late and deemed to be part of a rulemaking backlog. In the reports to Congress mandated by EPAct05, DOE identifies its top priority rulemakings and a multi-year schedule of when (i.e., in which calendar quarter) DOE might expect to issue one standard for each of the products in backlog. DOE also describes its near-term plans for rulemakings in the semi-annual, government-wide *Unified Agenda*.[39] Although it can vary, DOE completed roughly seven rulemakings per year from 2013 to 2017. The rulemaking backlog continues to increase and has roughly doubled since 1997 to where it now stands at 33 late rulemakings.[40]

Previous Attempts at Prioritization

DOE has issued documents to prioritize future rulemakings, take stock of its backlog, and set principles to establish the sequence of rulemakings. The principles these documents include are broad, and DOE has not explained in any detail what has motivated its plans for sequencing the rulemakings. For example, in DOE's most recent Statement of Regulatory and Deregulatory Priorities,[41] it discussed three priority rulemakings, one of which was to revise energy conservation standards for one particular category of equipment, commercial water heaters. The Statement noted that the rulemaking would save "up to 1.8 quads over 30 years and the net benefit to the Nation would be between $2.26 billion and $6.75 billion," but did not say which standards rulemakings DOE would address next.

DOE has published reports to Congress and policy documents that do use a sequencing approach as a way of planning its regulatory activities to revise the standards for the various categories of products and equipment. DOE states which standard or standards it plans to revise next. In policy

2019, at https://appliance-standards.org/sites/default/files/Missed_deadlines_as_of_Jan_2019.pdf.

[36] These four rulemakings included the following products and equipment: portable air conditioners, uninterruptible power supplies, air compressors, and commercial packaged boilers. Their status is explained at 85 *Federal Register* 1378 (January 10, 2020).

[37] Pursuant to an order from the U.S. District Court for the Northern District of California in the consolidated cases of *Natural Resources Defense Council, et al. v. Perry* and *People of the State of California et al. v. Perry*, Case No. 17-cv-03404-VC, as affirmed by the U.S. Court of Appeals for the Ninth Circuit in the consolidated cases Nos. 18-15380 and 18-15475.

[38] 85 *Federal Register* 1378 (January 10, 2020).

[39] The unified regulatory agenda, typically published twice per year, calls upon agencies to list their regulations under development. CRS In Focus IF12118, *The Unified Agenda of Federal Regulatory and Deregulatory Actions: An Overview*, by Maeve P. Carey. The Spring 2022 unified agenda was published in June 2022.

[40] U.S. Department of Energy, *Energy Conservation Standards Activities: Report to Congress*, Washington, DC, August 2021.

[41] U.S. Department of Energy, *Statement of Regulatory and Deregulatory Priorities*, Fall 2021, at https://www.reginfo.gov/public/jsp/eAgenda/StaticContent/202110/Statement_1900_DOE.pdf.

documents, DOE has developed a multi-factor method, applying several criteria, to decide which standard to revise next.

DOE has also taken another approach, sometimes concurrently with the above, to determine one at a time whether a standard might save sufficient energy or offset the use of barrels of oil to warrant revision. Should the standard not meet the threshold, the process would conclude with a final rule stating no new standard was needed.

The following two sections discuss these approaches.

Sequencing Approach

Multi-Factor Prioritization: The 1996 Process Rule

In 1996 DOE promulgated the so-called Process Rule—a set of procedures used to set efficiency standards and test methods for consumer products.[42] The Process Rule included a multi-factor prioritization scheme. DOE used this prioritization scheme to determine the sequence in which rulemakings were to be performed. Specifically, the Process Rule prioritized those rulemakings with higher conservation of energy. At the same time, it did not reduce the number of rulemakings overall. Roughly 10 years after issuing the Process Rule, DOE noted that its effect had been to prioritize conservation of energy but had the unintended consequence of contributing to a backlog of uncompleted statutorily-mandated standards.[43] DOE's prioritization scheme at that time did not include reducing the number of rulemakings; rather, it affected the order in which DOE performed the rulemakings.

Policy Documents That Proposed Sequences

DOE's required semi-annual reports to Congress, discussed above in "Late Rulemakings," included discussion and analysis of which revisions mandated by Congress were late or in "backlog" status. The reports further included a multi-year schedule of when (i.e., in which calendar quarter) DOE might expect to issue one standard for each of the products in backlog.[44] DOE's success in this approach varied, and with each succeeding semi-annual report DOE would provide an update on how it had met the previous multi-year schedule.

The 2021 Report to Congress included in its list of late rulemakings 25 that were overdue for the every-six-year review requirement.[45] The report further includes a list of rulemaking steps DOE was taking for a number of energy conservation standards and the anticipated completion date, but does not explain how it arrived at the sequence. The multi-year schedules have included the backlog standards noted above together with new standards required of DOE by act of Congress. DOE is responsible for addressing all these standards-setting activities concurrently along with test procedures and coverage determinations, among other things.

[42] The Process Rule is codified at 10 C.F.R. §430, Subpart C, Appendix A.

[43] U.S. Department of Energy, *Energy Conservation Standards Activities: Submitted Pursuant to Section 141 of the Energy Policy Act of 2005 and to the Conference Report (109-275) to the FY2006 Energy and Water Development Appropriations Act*, Washington, DC, January 2006, p. vii. DOE noted that two of the three revisions to standards using the Process Rule took much longer than the expected 36-month duration.

[44] For an example of a multi-year schedule, see Table 11 of DOE U.S. Department of Energy, *Energy Conservation Standards Activities: Report to Congress*, Washington, DC, January 31, 2006, pp. 65-66.

[45] U.S. Department of Energy, *Energy Conservation Standards Activities: Report to Congress*, Washington, DC, August 2021.

Threshold Approach

DOE has previously set criteria by which it could cull standards that did not meet certain criteria. None are still in effect. These criteria were intended to be applied, one at a time, when DOE set or revised a single standard. DOE would make its estimate of the energy savings expected over 30 years, compared to the incumbent product or equipment. The following subsections discuss these criteria.

Considering each standard separately disregards how the rulemaking might combine with other rulemakings to affect overall costs and benefits. Several standards taking effect concurrently may have cumulative effect on the consumption of energy commodities such as electricity and natural gas. This cumulative effect may change the price of energy commodities, which in turn may affect consumption as consumers and firms react to the new price—an effect that would be missed in the one-at-a-time approach.

DOE conducts analyses of impacts of the standards as a matter of routine during rulemakings and could use this type of analysis as guidance for setting priorities. Specifically, DOE analyzes the impact of a potential standard by comparing the energy used by the product or equipment currently in use to a product or equipment with better energy performance. For example, in the case of furnaces DOE utilized a model that considered units sold over the span of 30 years.[46] This so-called "vintage stock" model accounts for the removal from service of appliances after they reach a certain age. The new appliances take the place of the old ones, and these new appliances may have improved energy performance. The analysis adds up the incremental improvement in energy performance and treats these as a benefit of the new standard.[47] The following sections provide examples of DOE's use of such analyses for setting priorities in past policymaking and envisages possible future such uses.

Initial Phase of National Standards Program

In rulemakings in the early 1980s, DOE interpreted EPCA as having delegated to DOE the task of deciding what comprised "significant conservation of energy." DOE defined and applied a three-part threshold test during rulemakings in 1982 and 1983; satisfying any one part would qualify the potential standard as having achieved significant conservation of energy. These three parts were saving either: one-sixth (16.67%) of energy consumption over one year, relative to the market-incumbent appliance; or 1% of national electricity use; or 10,000 barrels per day of oil (or its Btu-equivalent in volume of natural gas).[48] DOE determined that none of the six appliances under consideration satisfied the test and concluded the "no standard" rulemakings without promulgating energy conservation standards, a situation discussed in more detail earlier in "History of Initial Phase."

[46] "National cumulative energy savings (NES_{cum}) are the sum of the annual NES over the lifetime of products shipped during the analysis period." See U.S. Department of Energy, "Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Residential Furnaces," August 30, 2016, p. 10-18, at https://www.regulations.gov/document/EERE-2014-BT-STD-0031-0217.

[47] Of note, while DOE's analysis can consider a variety of levels of energy performance, DOE's ultimate choice of standard must be at a level of energy performance that is economically justified. This may rule out the maximum level of performance that is technologically achievable—a level sometimes called "max tech."

[48] 48 *Federal Register* 39385a (August 30, 1983). DOE used a model that calculated the energy consumption at the residence for oil- and natural-gas consuming appliance. For electricity DOE calculated the energy consumed at the power plant, or roughly three times the energy consumed by the appliance.

2020 Revision to the Process Rule

For a time, DOE had a threshold of 0.3 quads in place, starting in 2020 with a revision to the Process Rule.[49] This threshold meant that, for any rulemaking underway for a new or revised standard, if DOE were to estimate it would save fewer than 0.3 quads, DOE would not proceed to issue the standard. The purpose was to "eliminate from further consideration those potential standards that are projected to result in substantially lower energy savings."[50] The policy took effect in 2020; however, DOE reversed the policy in 2022 without ever having applied it.[51] The following section, "Effect of Applying a Threshold on the Number of Rulemakings," analyzes what would have been the impact, had this threshold been applied to a group of standards rulemakings over several years. The analysis is a counter-factual, because DOE's policy was not in effect during the time interval, but the analysis is illustrative.

Effect of Applying a Threshold on the Number of Rulemakings

CRS used DOE's estimates of energy savings for rulemakings from 2013 to 2017, roughly one Presidential term of office, to determine the potential effect of a threshold. CRS applied a threshold at the same level DOE promulgated in 2020, or 0.3 quads.

In its analysis, CRS found 14 rulemakings would have been culled by the threshold. In the counterfactual situation in which DOE's 0.3-quad threshold had been in effect, DOE would not have revised those standards. CRS found that the standards that would have been culled would have accounted for 8% of the site energy saved relative to all the rulemakings of the four-year period.[52]

Figure 3 shows the rulemakings just discussed and their projected energy savings. The figure displays the rulemakings in order of increasing site energy savings, moving left to right along the horizontal axis.

Some equipment is known as "ASHRAE equipment"—ASHRAE is the American Society of Heating, Refrigerating and Air-Conditioning Engineers—to acknowledge the standards issued independently by that organization in conjunction with the American National Standards Institute (ANSI) and the Illuminating Engineering Society (IES). The CRS analysis does not include standards DOE revises after ASHRAE publishes a new standard, the so-called ASHRAE trigger, as these have unique statutory and other requirements DOE must follow in determining whether or not to update the energy conservation standards.[53] ASHRAE equipment includes "generally, commercial water heaters, commercial packaged boilers, commercial air conditioning and heating equipment, and packaged terminal air conditioners and heat pumps."[54]

[49] 85 *Federal Register* 8626 (February 14, 2020).

[50] 85 *Federal Register* 8656 (February 14, 2020).

[51] 86 *Federal Register* 70892 (December 13, 2021).

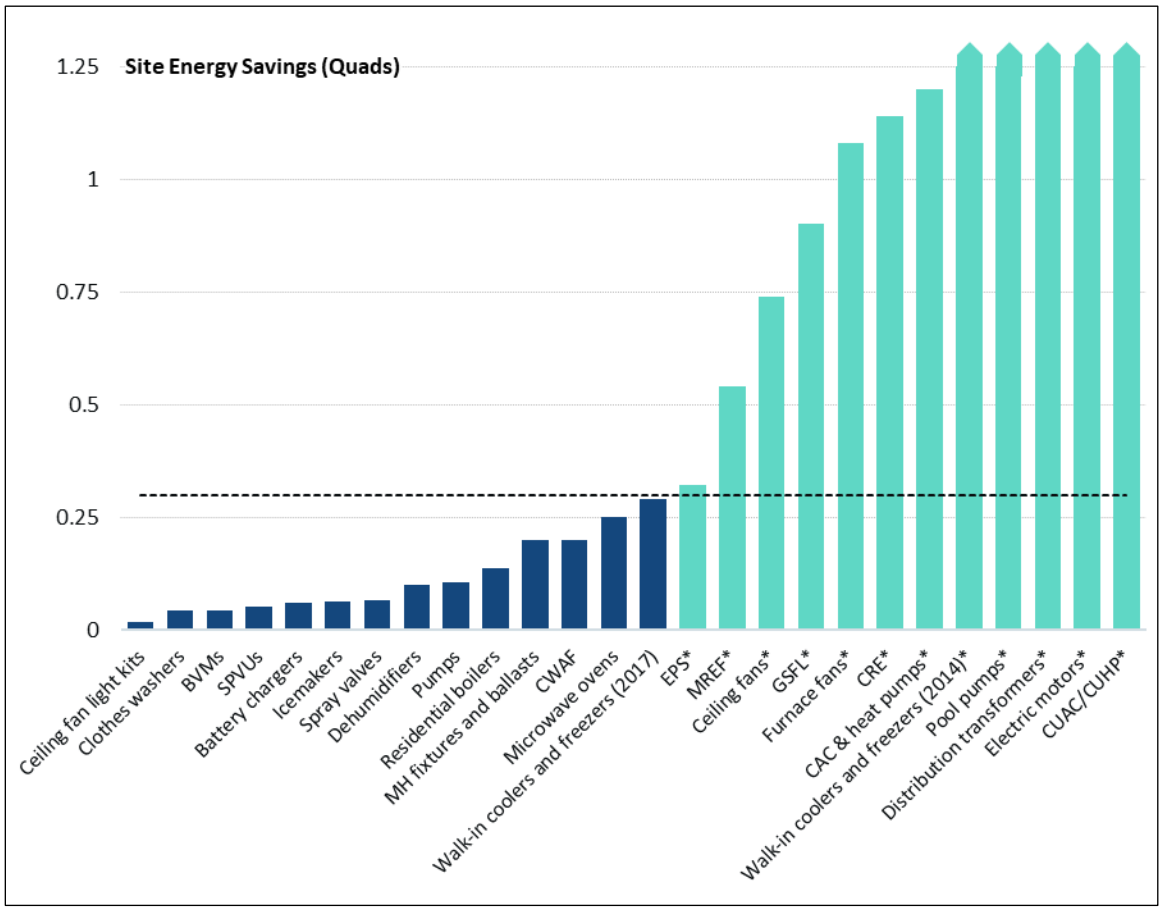
[52] This calculation used the energy consumed at the site by the product or equipment, but in the case of electrical appliances, the calculation also included the energy needed to generate the electricity in the first place. Using a different method of accounting for the energy that DOE published in 2012 (76 *Federal Register* 51281, August 18, 2011) would result in an additional three standards passing the test.

[53] 42 U.S.C. §6313(a)(6). This equipment includes "generally, commercial water heaters, commercial packaged boilers, commercial air conditioning and heating equipment, and packaged terminal air conditioners and heat pumps." 85 *Federal Register* 8708a (February 14, 2020).

[54] 85 *Federal Register* 8708a (February 14, 2020).

Figure 3. Effect of Applying an Energy Savings Threshold

Calculated on the basis of site energy savings



Source: *Federal Register* notices and technical support documents for rulemakings. Values for "site energy savings" are from DOE, Energy Savings Data for DOE Energy Conservation Standards, 1989-2019, July 22, 2019, at https://www.regulations.gov/document/EERE-2017-BT-STD-0062-0144. See also 84 *Federal Register* 36037 (July 26, 2019).

Notes: * denotes the revised standard would have satisfied the 0.3 quad, site energy threshold indicated by the dotted line. BVM = beverage vending machine; SPVU = single-package vertical units (i.e., single-package vertical air conditioner and single-package vertical heat pumps); MH = metal halide; CWAF = commercial warm air furnace; EPS = external power supply; MREF = miscellaneous refrigeration equipment; GSFL = general service fluorescent lamps; CRE = commercial refrigeration equipment; CAC = central air conditioning; CUAC/CUHP = air-cooled commercial unitary air conditioners and heat pumps. The last five standards to the right have savings that exceed the range of the vertical axis. Walk-In Coolers and Freezers (2014), 1.25 quads; Pool Pumps, 1.3 quads; Distribution transformers, 1.9 quads; Electric motors, 2.8 quads; CUAC/CUHP, 5.5 quads.

One of the effects of culling standards according to a criterion or criteria is to alter the costs and benefits delivered by the national standards program. DOE has estimated the savings to consumers and firms that accrue from reduced energy costs, net of any higher first cost of the appliance or repair or other costs. DOE and nongovernmental organizations have pointed to this benefit as among the chief reasons for the national standards programs.[55] **Figure 4** shows the net

[55] See U.S. Department of Energy, Building Technologies Office, "History and Impacts: Buildings" at https://www.energy.gov/eere/buildings/history-and-impacts; Appliance Standards Awareness Project, "Major Home Appliance Efficiency Gains to Deliver Huge National Energy and Water Savings and Help to Jump Start the Smart

present value (NPV)[56] for the rulemakings for the category of product and equipment in the same left-to-right order as **Figure 3**. Note while there is, by design, a steady increase moving left to right in **Figure 3**, the NPV plot of **Figure 4** does not increase in the same steady, monotonic fashion. This illustrates the difficulty of choosing or discarding potential standards based on one measure or the other, and shows that some standards may be more cost-effective even if their total energy savings is lower.

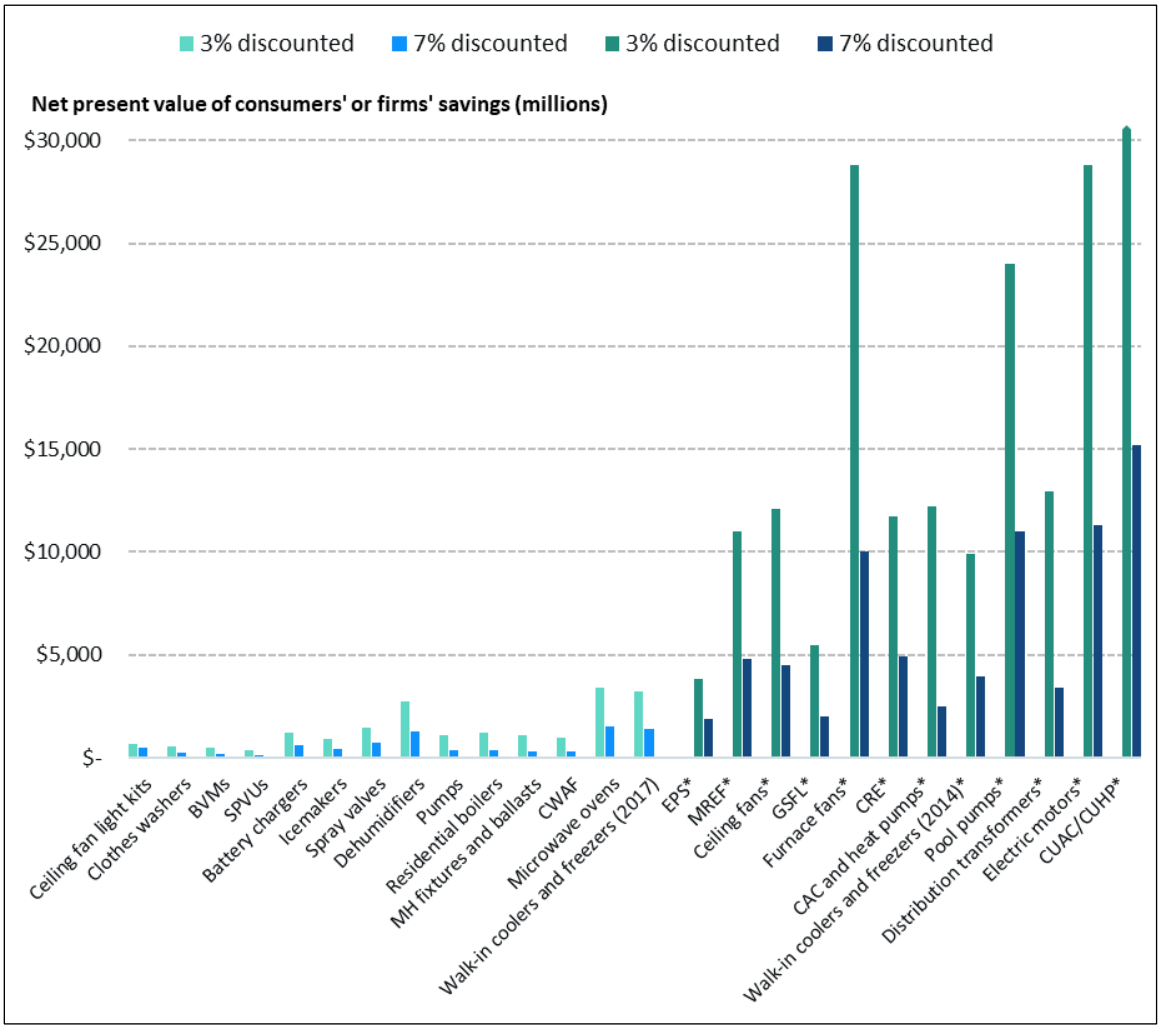
The 14 standards that fell below the 0.3 quad threshold, site energy basis, would have saved consumers and firms $1.4 billion at 3% and $0.6 billion at 7% discount rates. The comparison is not completely rigorous because the 14 standards do not run concurrently or use the same base year for the NPV calculations; the analysis neglected the impact of the reduced energy consumption on energy prices; the analysis did not take account of substitution between different appliances or their collective impact on energy commodities; and the analysis assumes no new standards for 30 years and makes other assumptions about the future that might be overtaken by events.

Grid," press release, August 3, 2010, at https://appliance-standards.org/document/major-home-appliance-efficiency-gains-deliver-huge-national-energy-and-water-savings-and.

[56] The calculation of *net present value* (NPV) takes account of purchase price in year zero and cash flow in all future years but mathematically discounts (i.e., reduces) the amount of savings before adding all of them together into one "present value." The savings in years far off in the future contribute less to NPV because the calculation compounds the mathematical discount factor. Interested readers may find further details in OMB Circular A-4, which says: "If we take the rate that the average saver uses to discount future consumption as our measure of the social rate of time preference, then the real rate of return on long-term government debt may provide a fair approximation. Over the last thirty years, this rate has averaged around 3 percent in real terms on a pre-tax basis." Office of Management and Budget, *Circular A-4* , September 17, 2003, at https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/circulars/A4/a-4.pdf, p. 33.

Figure 4. DOE-Reported Consumers' and Firms' Savings Due to Rulemakings, 2013-2017

Covers appliances purchased over a 30-year period



Source: Federal register notices and technical support documents for rulemakings.

Notes: Abbreviations as in **Figure 3**. (*) denotes the revised standard would have satisfied the 0.3 quad, site energy threshold; those standards are shown in dark blue and dark green. The figure shows two values for NPV of savings—one at 3% and one at 7% discounting; in each pairing, the 3% is on the left. Interested readers should consult OMB Circular A-4. The NPV of the right-most standard, CUAC/CUHP, discounted at 3%, exceeds the range of the vertical axis.

Other Methods of Prioritizing

The previous section discussed methods of addressing the backlog that involve either sequencing the rulemakings according to some set of criteria or method; or setting and applying a threshold of energy savings, to cull standards from the revisions process, one at a time. This section of the report discusses two additional approaches, piloted by DOE and other organizations, which if implemented could prove useful and provide greater analytical power.

In one of these approaches, DOE would be anticipatory and analyze groups of standards. These groups could be standards due for the every-six-year review or standards corresponding to the

type of energy service they provide (e.g., thermal comfort). Another approach would be to broaden the analysis to include all energy-consuming devices, not just those already covered by the national standards program.

Analyzing Many Standards at Once

First, DOE could prioritize using the information gleaned from an analysis of many standards, one at a time, and comparing the marginal benefits of each. The analyses would be similar in scope to those performed when applying a threshold—see "Threshold Approach," above—but would be applied to larger numbers of standards. The results of the analyses would allow DOE to make a determination about the relative importance of the rulemakings and establish a sequence to perform them. DOE could use this information to establish a clear top-to-bottom rank order. One way to establish the sequence would be according to the quantity of energy saved, although other options include ranking by cost-effectiveness or marginal cost to the consumer.

DOE has conducted analyses of many standards at once in past exercises; however, some of these considered the impacts of the standards one at a time, in isolation from one another. One such example took place in 2002, in which DOE published a list of possible actions following a recommendation from the National Energy Policy Development Group.[57] DOE evaluated the energy savings due to 36 candidate standards—new and amended.[58] DOE developed "data sheets" on all 36 standards, populating each with analyses, some of which were taken from existing rulemakings.[59] DOE further reduced this list based on applying a threshold of one quad of energy savings, made some refinements, and settled on a list of 15 for further consideration.

In a similar exercise, DOE conducted a study of 10 categories of products and equipment when codifying the standards Congress specified in EISA 2007.[60] The study estimated several quantified benefits and costs—energy savings; consumer and firm cost savings; industry NPV (INPV); and reductions in emissions. DOE did not use these to assign priorities or a sequence in which to conduct the rulemakings.[61] However, the study is another example of how DOE could assess the potential energy savings of many standards at once.

Analyzing many standards at a time offers one possible tool for ranking them in the order they might be addressed in rulemakings. DOE's 2002 study, for example, did lead to a short-list of standards DOE might revise first. However, DOE did not implement this strategy as it lacked the authority to do so.

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[57] U.S. Department of Energy, *Appliance Standards Program: The FY2003 Priority-Setting Summary Report and Actions Proposed*, Washington, DC, August 22, 2002, at https://www.energy.gov/sites/default/files/2013/12/f5/fy03_priority_setting_rpt.pdf. National Energy Policy Development Group, "Reliable, Affordable, and Environmentally Sound Energy for America's Future: Report of the National Energy Policy Development Group," May 2001, available at https://www.nrc.gov/docs/ML0428/ML042800056.pdf.

[58] DOE included other types of analyses besides energy savings. Ibid., Table 1-5.

[59] U.S. Department of Energy, *Appendix B: Data Sheets for Existing Products*, Washington, DC, at https://www.energy.gov/sites/default/files/2013/12/f5/fy03_priority_setting_app_b.pdf.

[60] U.S. Department of Energy, *Technical Support Document: Impacts on the Nation of Energy Independence and Security Act of 2007*, Washington, DC, March 2009, at https://www1.eere.energy.gov/buildings/appliance_standards/pdfs/en_masse_tsd_march_2009.pdf.

[61] This study considered "the difference between typical baseline product models and product models that comply with the new EISA 2007 prescribed standard" and "gathered data on shipments or installed equipment stock, baseline efficiency levels, and typical product usage to determine energy savings benefits of the prescribed standards." For purposes of calculating the cumulative energy savings, DOE assumed the existing stock of appliances and equipment performed at the minimum level of the preexisting federal standards.

Another study by the American Council for an Energy Efficient Economy (ACEEE), like DOE's EISA 2007-mandated study, started with the current national standards program and projected the incremental energy savings due to an assumed set of new standards.[62] The study made its projections by reasoning that the energy performance of the new appliances that replace the old stock would be at the maximum level that is technologically feasible (i.e., "max tech"). This study and its methods also illustrate one of the challenges in adapting studies of energy efficiency to the purposes of the national standards program; standards, to be promulgated, must satisfy the statutory requirement of being economically justified. DOE's analyses in past rulemakings have found that the max tech level of performance, while technologically feasible, is not always economically justified.

Similarly, a 2015 report by DOE considered seven groups of commercial equipment and estimated the energy savings potential if the current stock were to be replaced with max tech.[63] The study measured potential savings, one type of equipment at a time, against a baseline in which the energy performance of the commercial equipment continued to improve gradually.[64] The study was not, however, designed to suggest priorities for regulations nor did it include the analysis of which of these instances of max tech equipment would have met the EPCA test of being economically justified. The authors noted that within an end-use category, the results for individual technologies could not be added together.[65] DOE has commissioned similar reports on single categories (e.g., household furnaces or commercial refrigeration equipment) of products and equipment and on groups.[66]

Studying the Energy Efficiency Potential

The second prioritization possibility is the so-called energy efficiency potential. These studies can include all types of energy-consuming devices, not just those already covered by EPCA, as amended. In this option, DOE could conduct analyses of the energy savings and other benefits of revising designated groups of standards, which, as shown in the text box below, might be comprised of a group of appliances that deliver one type of energy service. Generally speaking, analyses of efficiency potential take account of interactions between efficiency opportunities.[67] For example, such an analysis would consider the fact that appliances in the group may compete in the marketplace against one another because they can substitute for one another; central air conditioners might compete with room air conditioners. As discussed earlier, a group of standards that run concurrently may have a cumulative effect on the consumption of energy commodities including electricity, natural gas, and so forth. This effect might change the price of energy commodities, which in turn may affect consumption as consumers and firms react to the new price—an effect that would be missed in the one-at-a-time approach.

[62] J. Mauer and A. deLaski, *A Power Priority: How Appliance Standards Can Help Meet U.S. Climate Goals and Save Consumers Money,* American Council for an Energy-Efficient Economy and Appliance Standards Awareness Project, Research Report, Washington, DC, November 2020.

[63] W. Goetzler et al., *Energy Savings Potential and RD&D Opportunities for Commercial Building Appliances (2015 Update),* U.S. Department of Energy, DOE/EE-1393, Washington, DC, June 2016.

[64] Ibid., p. 7.

[65] Ibid., p. 8.

[66] These reports may be found at http://www.osti.gov by searching on "energy savings potential."

[67] P. Mosenthal and J. Loiter, *Guide for Conducting Energy Efficiency Potential Studies: A Resource of the National Action Plan for Energy Efficiency,* National Action Plan for Energy Efficiency, November 2007, p. C-4.

These studies have the common goal of determining what might be the savings in energy if large numbers of energy-consuming products and equipment were replaced with new ones having superior energy performance. Such a study may identify gaps in the scope and coverage of the national standards program.[68]

A study by the Electric Power Research Institute (EPRI) relied on detailed forecasts of the number and type of appliances expected to be in use in the future as the old stock of appliances was replaced.[69] The study calculated the extent to which more energy-efficient appliances replaced the existing stock based on technical feasibility and market and policy factors. The study reported results by end-use category by census region or division. The study found that results can vary by region: for the New England Division, the study found the three categories with the highest achievable potential for energy savings were commercial indoor lighting; residential computers; and commercial other electronics (i.e., non-computer); for the South Atlantic Division, the top three were commercial indoor lighting, but followed instead by residential central air conditioning and commercial central air conditioning.

The method of efficiency potential could, on the one hand, suggest DOE sequence its rulemakings, conducting those rulemakings for the groups or end-use categories with the highest efficiency potential first. On the other hand, DOE could choose not to revise the standards having lowest efficiency potential, were Congress to grant DOE such authority. The efficiency potential analysis could further reveal that large energy savings were possible for products or equipment not currently covered in the national standards program. Congress could consider making this a covered product or require DOE study the possibility of making it a covered product.[70] The Secretary of Energy could also classify a product as "covered" and subject to binding standards provided certain statutory criteria are met.[71]

However it is to be calculated, the energy efficiency potential for some groups of appliances—whether a specific end-use category or other collection—may be greater than for others. DOE already applies such groupings to the national standards program in the multi-year schedule it reports to Congress; the text box below lists the groups DOE has used in the past. DOE could then devote its resources to a basket of rulemakings, analyzing and promulgating standards for the group or groups of appliances it deems to have the greatest potential to save energy.

[68] The one-at-a-time analyses described in the previous section could do so as well—be analyzed in groups; it is not exclusive to energy efficiency potential studies.

[69] Electric Power Research Institute, *U.S. Energy Efficiency Potential Through 2035*, technical report, Palo Alto, CA, 2014.

[70] For example, NAECA directed DOE to consider a separate standard for the smaller capacity furnaces found in warmer regions of the country. 42 U.S.C. §6295(f)(1)(B).

[71] 42 U.S.C. §6292(b). A recent example is the Secretary's determination of air cleaners as a covered consumer product. 87 *Federal Register* 42297 (July 15, 2022).

Groups of Standards Tracked by DOE

DOE has in the past tracked its ongoing standards development activities in the following categories:

- Heating Products
- Transformers, Motors, and Pumps
- Lighting
- Home Appliances
- Space Cooling
- Commercial Refrigeration
- Electronics (e.g., power supplies, computers, computer servers)

Source: Department of Energy, *Energy Conservation Standards Activities: Report to Congress*, Washington, DC, February 2014, pp. 15-17.

Effect of Prioritizing the Rulemakings

Potential Advantages of Prioritizing Rulemakings

Reduced Number of Rulemakings

One reason given to prioritize rulemakings by applying the criteria discussed in this report is to realize the benefits of significant conservation of energy as soon as possible. Delaying the revisions delays the energy savings and other benefits that would accrue with new standards. A 2018 court order focused on the impact of the delay: "DOE's failure to publish the efficiency standards for air compressors, commercial packaged boilers, portable air conditioners, and uninterruptible power supplies harms the Government Plaintiffs [i.e., the states] by delaying the energy efficiency benefits the Final Rules achieve."[72]

A prioritization could address the backlog by reducing the number of still-to-be-completed rulemakings in **Figure 2** by forgoing the revisions that would not meet the prioritization minimum threshold and allowing more existing resources to be allocated to the remaining required rulemakings.

Reduced Burden on Industry

Another reason to prioritize rulemakings would be to reduce burdens on industry. In almost all cases, DOE has estimated its rulemakings to impose additional costs on industry.[73] The rulemaking documents use INPV for this purpose, which is the horizontal axis of **Figure 5**, representing the change in the discounted net cash flow accrued by the manufacturers over a 30-year period.[74] In the case of the residential boiler rulemaking, the INPV would on average

[72] Pursuant to an order from the U.S. District Court for the Northern District of California in the consolidated cases of *Natural Resources Defense Council, et al. v. Perry* and *People of the State of California et al. v. Perry*, Case No. 17-cv-03404-VC, as affirmed by the U.S. Court of Appeals for the Ninth Circuit in the consolidated cases Nos. 18-15380 and 18-15475 at 39.

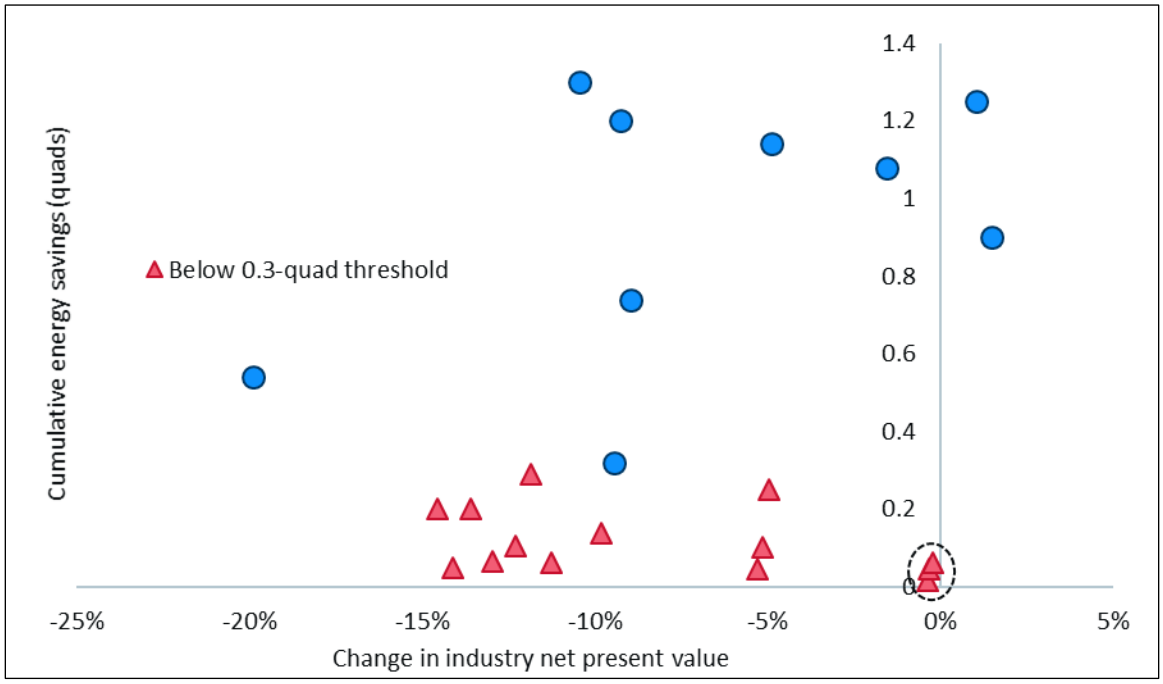
[73] See Figure 6 of CRS Report R47038, *The Department of Energy's Appliance and Equipment Standards Program*, by Martin C. Offutt.

[74] DOE's review of energy saved by its standards shows that it has used the 30-year analysis period consistently since 2008. The energy savings and other metrics accrue over the lifetime of any products or equipment purchased during the 30 years. See 84 *Federal Register* 36037 (July 26, 2019).

decrease 0.31%.[75] Skipping the rulemaking, on the other hand, would mean the burden on industry would be essentially zero because DOE would not be imposing any further costs on manufacturers. At the same time, forgoing the rulemaking would also forgo potential economic benefits to consumers.

Figure 5. Relationship Among Reported Benefits and Costs of Rulemakings, 2013-2017

Rulemakings with relatively small energy savings can nonetheless be some of the least costly for industry (dotted circle near origin)



Source: *Federal Register* notices and Technical Support Documents for rulemakings.

Notes: Less than the 0.3 quad threshold = red triangle, greater than or equal to the 0.3 quad threshold = blue circle. Not shown on the chart are distribution transformers (-4.0% INPV change, 1.9 quads), electric motors (-0.7% INPV change, 2.8 quads), and air-cooled commercial unitary air conditioners and heat pumps (CUAC/CUCHP) (-14.6% INPV change, 5.5 quads). These all would have exceeded the 0.3-quad threshold.

Reduced Burden for Some Consumers

A further effect of reducing the number of standards is that some consumers who otherwise would incur net costs would be spared. DOE has estimated some standards that on average save consumers money in the purchase of the new appliance, may at the same time incur higher costs for a small number of consumers.[76] In the case of the residential boilers, DOE estimated that, across all product classes, 2.7% of residential boilers would be more expensive to purchase and own (i.e., increase the life-cycle costs).[77] The life-cycle costs include both the upfront cost and the costs (or savings) of operating and maintaining the product or equipment—all relative to the

[75] 81 *Federal Register* 2393b (January 15, 2016).

[76] The calculation of life-cycle costs considers lower fuel costs of the new, more efficient appliance, and any higher purchase and installation costs.

[77] The percentage is shipment-weighted across all product classes. 81 *Federal Register* 2405 (January 15, 2016).

products or equipment that would be purchased in the absence of a revised standard. Sometimes the more efficient appliance can be more expensive to purchase but will lead to lower energy costs, if consumption does not change.[78] The promise of lower life cycle costs may not appeal to all consumers, who may continue to use and repair a less efficient product rather than pay the up-front cost of the replacement, irrespective of whether the life-cycle cost analysis promises overall savings.[79]

Potential Disadvantages of Prioritizing Rulemakings

Reduction in the Estimated Energy Savings

Had DOE applied the 0.3-quad threshold test to rulemakings from 2013 to 2017, it would as noted have dropped 14 standards rulemakings. Doing so would have foregone 1.625 quads of energy savings, 8% of the energy savings due to all rulemakings issued during that time period. **Figure 3** shows the amount of energy each of the below-threshold rulemakings was estimated to save.

Foregoing Consumers' and Firms' Cost Savings

The standards can reduce the total cost of ownership to consumers and firms. In other words, the appliances and equipment that comply with the new standard can accrue savings due to lowered energy bills, even when taking into account the higher initial cost of the appliance.[80] As noted in this report, some consumers may continue to use and repair a less efficient product instead. The cost savings is one of the quantities DOE considers when setting the quantitative level of energy conservation for a particular standard.[81]

In the counterfactual case provided in this report, culling the 14 standards that did not meet the 0.3-quad threshold would have foregone a total savings of roughly $19 billion, discounted at 3%; or roughly $8 billion, discounted at 7%. This calculation is an estimate and there are the following caveats: the 14 standards are being added together despite the fact that they did not run concurrently; the analysis neglected the impact of the reduced energy consumption on energy prices; the analysis did not take into account substitution between different appliances or their collective impact on energy commodities; and the analysis assumes no new standards for 30 years and makes other assumptions about the future that might be overtaken by events.

Again using the residential boiler example, the DOE analysis estimates that over the lifetime of all residential boilers that would be sold under the revised standards over a 30-year period, consumers would save $1.212 billion, discounted at 3% or $0.353 billion, discounted at 7%. These benefits would have otherwise been foregone had DOE chosen not to complete the rulemaking.

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[78] Consumption may change due to the lower cost of electricity or other fuel. The "rebound effect" can occur if the lower operating cost induces higher demand for the energy service. DOE considers the rebound effect in the case of furnaces, for example. See Chapter 8 of U.S. Department of Energy, *Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Residential Furnaces*, Washington, DC, August 30, 2016, at https://www.regulations.gov/document/EERE-2014-BT-STD-0031-0217.

[79] 84 *Federal Register* 3924 (February 13, 2019).

[80] The analyses determine the incrementally higher cost of the standards-compliant product (appliance) versus the product consumers would have purchased without a new standard.

[81] "DOE found the benefits to the nation of the standards (energy savings, customer LCC [life cycle cost] savings, positive NPV of customer benefit, and emission reductions) outweigh the burdens (loss of INPV and LCC increases for some users of these equipment)." 81 *Federal Register* 1033a (January 8, 2016).

Comparison to Current Approach

The above sections have discussed implementing particular methods to prioritize the rulemakings. The current approach would, in contrast to such methods, not require the additional resources to administer the program. Specifically, the current approach would not require the additional analyses and associated costs such as additional staff who might oversee or execute the analyses. These associated costs, were they to be incurred, might cause a corresponding decrease in funding for other programs, implying a shift in priorities.

The current approach also would likely leave unaltered the current speed with which the reviews are performed. The frequency of revisions, while it might lag the every-six-year requirement, could reduce conversion costs, relative to one of the above prioritization schemes, as manufacturers change their product design and manufacturing lines. For example, at least three of the categories represented in **Figure 3**, **Figure 4**, and **Figure 5** incurred conversion costs, ranging from $9.2 million to $184 million per category, in DOE's estimate.[82] Any attempt to bring the frequency of revisions in line with the every-six-year requirement might lead to more frequent conversion costs, relative to the current approach.

The current approach, by keeping all standards in play, spreads any potential costs more equally across manufacturers. A prioritization scheme might favor those categories having greater potential for energy savings and conduct more frequent revisions to those categories. The costs might fall disproportionately on a subset of manufacturers whose products had this greater potential. Maintaining the current approach would avoid the possibility of these more frequent costs.

Options for Congress

DOE maintains a list of the backlog of energy conservation standards for which it has not begun the periodic review required by EISA 2007. DOE and Congress have attempted to address the backlog since the 1990s. Below we describe the status quo and three options for Congress that could help DOE reduce the backlog.

Left unchanged, the current approach will likely increase the backlog of rulemakings, which stood at 33 in the last DOE report to Congress.[83] The costs to administer the program would not increase due to any additional analyses needed as part of a prioritization scheme. No categories of products and equipment would be subject to increased frequency of revisions necessitating more frequent changes to manufacturing and product design.

First, Congress could consider legislation that addresses the question of what comprises "significant conservation of energy." The most straightforward way would be to specify a minimum quantity or percent of energy saved by the new standard, and only if this minimum were to be satisfied might DOE proceed with revising a standard. This would reduce the number of revisions DOE must complete, allowing more existing resources to be allocated to the remaining upcoming required revisions and to reducing the backlog. The avoided rulemakings (red triangles in **Figure 5**, assuming a 0.3 quad threshold) might nonetheless have reduced consumers' energy consumption (and thus reduce their energy bills). Further, some of the

[82] The included the following categories: SPVU, commercial refrigeration equipment, and walk-in coolers/walk-in freezers.

[83] U.S. Department of Energy, *Energy Conservation Standards Activities: Report to Congress*, Washington, DC, August 2021.

rulemakings may have accomplished these savings at very little cost to industry; a group of these are circled in Figure **5** at the bottom right.

Second, Congress could require DOE to conduct a periodic study of many of the standards. One study could be the list of standards scheduled for the mandatory six-year review in a given year. Such a study could determine the expected energy savings of each, individually, and might be similar in scope to the studies DOE conducted in 2007 to estimate the impacts of the standards mandated by EISA 2007.[84] DOE could use these insights to prioritize groups of standards for which it estimates the highest conservation of energy. This approach has the advantage over the one-at-a-time approach (the first option, above) in that it would give the decisionmaker information on how several years' worth of rulemakings would provide national energy savings on a cumulative basis.

Third, Congress could require DOE to prepare a report assessing the energy efficiency potential. This could cover consumer products and commercial equipment of any type, not just those currently regulated by DOE and thus might capture additional opportunities for energy savings. Congress could specify that such studies examine which groups of standards would save the most. These groups could include heating products, lighting, home appliances, electronics and so forth.[85] DOE could then devote its resources to analyzing and promulgating standards for the group or groups of appliances it deems to have the greatest energy efficiency potential. The report could be submitted to Congress as part of the reports already required under EPCA.

Table 1 summarizes the pros and cons of the above three options and also compares them to the current approach.

Table 1. Summary of Options for Congress

Approach	Pros	Cons	Impact on Benefits
Current approach—all standards revised	Clarity about need to proceed with all standards. No additional costs from analyses to support prioritizing.	Requires more rulemakings hence backlog more likely to grow.	None (baseline case).
Apply an energy threshold test during each rulemaking	Easy to apply threshold to decide whether to revise a standard or not.	No foresight gained on impact of future rulemakings.	May eliminate standards that save consumers large amounts on energy bills at relatively low cost to industry.
Conduct scoping analysis of standards due for six-year review	Relatively quick to conduct analysis. Identifies a sequence in which to conduct rulemakings.	Calls for a multi-factor judgment of which groups of standards merit immediate attention.	Gives decisionmakers a look-ahead at which standards will deliver the greatest benefits.

[84] U.S. Department of Energy, *Technical Support Document: Impacts on the Nation of Energy Independence and Security Act of 2007*, Washington, DC, March 2009.

[85] U.S. Department of Energy, *Energy Conservation Standards Activities: Report to Congress*, Washington, DC, February 2014, pp. 15-17.

Estimate the energy efficiency potential for all devices, whether or not included in national standards program	Prioritizes a group of appliances and equipment. Allows foresight on how several standards might interact to change the total benefits of the group.	Resource-intensive to perform the analysis.	May identify new products and equipment where regulation could deliver benefits not now captured.

Source: CRS analysis.

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Disclaimer