DEPARTMENT OF ENERGY

10 CFR Part 431

[EERE–2019–BT–STD–0033]

RIN 1904–AE78

Energy Conservation Program: Energy Conservation Standards for Single Package Vertical Units

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

ACTION: Notice of proposed rulemaking; notification of proposed determination and announcement of public meeting.

SUMMARY: The Energy Policy and Conservation Act, as amended (EPCA), prescribes energy conservation standards for various consumer products and certain commercial and industrial equipment, including single package vertical air conditioners (SPVACs) and single package vertical heat pumps (SPVHPs), collectively referred to as single package vertical units (SPVUs). EPCA also requires the U.S. Department of Energy (DOE) to periodically review standards. In this notice of proposed rulemaking (NOPR); notification of proposed determination (NOPD), DOE proposes to amend the current energy conservation standards for SPVUs such that the existing standard levels would be based on a new cooling efficiency metric of Integrated Energy Efficiency Ratio (IEER) for SPVACs and SPVHPs, and the current heating efficiency metric of Coefficient of Performance (COP) for SPVHPs (but without any increase in stringency), In addition, DOE has initially determined that more-stringent standards for SPVUs would not be economically justified and would not result in a significant conservation of energy. DOE also announces a public meeting to receive comment on these proposed standards and associated analyses and results.

DATES: *Comments:* DOE will accept comments, data, and information regarding this NOPR/NOPD no later than February 6, 2023.

Meeting: DOE will hold a public meeting via webinar on Monday, January 9th, 2023, from 1:00 p.m. to 4:00 p.m. See section VIII, ''Public Participation,'' for webinar registration information, participant instructions, and information about the capabilities available to webinar participants.

Comments regarding the likely competitive impact of the proposed standard should be sent to the Department of Justice contact listed in the **ADDRESSES** section on or before January 9, 2023. DOE notes that the Department of Justice is required to transmit its determination regarding the competitive impact of the proposed standard to DOE no later than February 6, 2023. Commenters who want to have their comments considered by DOE as part of any further rulemaking resulting from this NOPR/NOPD also should submit such comments to DOE in accordance with the procedures detailed in this proposal.

ADDRESSES: Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at *www.regulations.gov,* under docket number EERE–2019–BT–STD–0033. Follow the instructions for submitting comments. Alternatively, interested persons may submit comments, identified by docket number EERE–2019–BT–STD–0033 and/or RIN 1904–AE78, by any of the following methods:

Email: SPVU2019STD@ee.doe.gov. Include the docket number EERE–2019–BT–STD–0033 and/or RIN 1904–AE78 in the subject line of the message.

Postal Mail: Appliance and Equipment Standards Program, U.S. Department of Energy, Building Technologies Office, Mailstop EE–5B, 1000 Independence Avenue SW, Washington, DC 20585–0121. Telephone: (202) 287–1445. If possible, please submit all items on a compact disc (CD), in which case it is not necessary to include printed copies.

Hand Delivery/Courier: Appliance and Equipment Standards Program, U.S. Department of Energy, Building Technologies Office, 950 L'Enfant Plaza SW, 6th Floor, Washington, DC 20024. Telephone: (202) 287–1445. If possible, please submit all items on a CD, in which case it is not necessary to include printed copies.

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

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

The docket web page can be found at: *www.regulations.gov/search/docket?filter=EERE-2019-BT-STD-0033.* The docket web page contains instructions on how to access all documents, including public comments, in the docket. See section VIII (Public Participation) of this document for information on how to submit comments through *www.regulations.gov.*

EPCA requires the U.S. Attorney General to provide DOE a written determination of whether the proposed standard is likely to lessen competition. The U.S. Department of Justice (DOJ) Antitrust Division invites input from market participants and other interested persons with views on the likely competitive impact of the proposed standard. Interested persons may contact the Antitrust Division at *energy.standards@usdoj.gov* in advance of the date specified in the **DATES** section. Please indicate in the ''Subject'' line of your email the title and Docket Number of this rulemaking.

FOR FURTHER INFORMATION CONTACT: Ms. Catherine Rivest, 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) 586–7335. Email: *ApplianceStandardsQuestions@ee.doe.gov.*

Mr. Eric Stas, U.S. Department of Energy, Office of the General Counsel, GC–33, 1000 Independence Avenue SW, Washington, DC, 20585–0121. Telephone: (202) 586–5827. Email: *Eric.Stas@hq.doe.gov.*

For further information on how to submit a comment, review other public comments and the docket, or participate in the public meeting webinar, contact the Appliance and Equipment Standards Program staff at (202) 287–1445 or by email: *ApplianceStandardsQuestions@ee.doe.gov.*

SUPPLEMENTARY INFORMATION:

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I. Synopsis of the Proposed Rule

The Energy Policy and Conservation Act,[1] as amended, Public Law 94–163 (42 U.S.C. 6291–6317, as codified) authorizes DOE to regulate the energy efficiency of a number of consumer products and certain industrial equipment. Title III, part C [2] of EPCA, established the Energy Conservation Program for Certain Industrial Equipment. (42 U.S.C. 6311–6317) This equipment includes single package vertical air conditioners (SPVACs) and single package vertical heat pumps (SPVHPs), collectively referred to as single package vertical units (SPVUs), the subject of this proposed rulemaking. SPVUs are a category of commercial package air conditioning and heating equipment. (42 U.S.C. 6311(1)(B)–(D); 42 U.S.C. 6313(a)(10))

Pursuant to EPCA, DOE must consider amending the Federal energy efficiency standards for certain types of commercial and industrial equipment, including the equipment at issue in this document, whenever the Department is triggered by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) acting to amend the standard levels or design requirements prescribed in ASHRAE Standard 90.1, ''Energy Standard for Buildings Except Low-Rise Residential Buildings,'' (ASHRAE Standard 90.1). (42 U.S.C. 6313(a)(6)(A)–(B)) In addition, EPCA contains an independent review requirement for this same equipment (the 6-year-lookback review), which requires DOE to consider the need for amended standards every six years. To adopt standard levels more stringent than those contained in ASHRAE Standard 90.1, DOE must have clear and convincing evidence to show that such standards would be technologically feasible and economically justified and would save a significant additional amount of energy. (42 U.S.C. 6313(a)(6)(C)) DOE is conducting this proposed rulemaking under EPCA's 6-year-lookback review authority.

The current Federal energy conservation standards for SPVUs are set forth at title 10 of the Code of Federal Regulations (CFR), 10 CFR 431.97(d) and, as specified in 10 CFR 431.96, those standards are denominated in terms of the cooling efficiency metric, Energy Efficiency Ratio (EER) and the heating efficiency metric, Coefficient of Performance (COP), and based on the rating conditions in American National Standards Institute (ANSI)/Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Standard 390–2003, ''Performance Rating of Single Package Vertical Air-Conditioners and Heat Pumps'' (ANSI/AHRI 390–2003). ASHRAE Standard 90.1–2019 references this same industry test standard.

On June 24, 2021, AHRI published AHRI Standard 390–2021, ''Performance Rating of Single Package Vertical Air-Conditioners and Heat Pumps'' (AHRI 390–2021), which supersedes ANSI/AHRI 390–2003. AHRI 390–2021, which was developed as part of an industry consensus process, includes revisions that DOE determined improve the representativeness, repeatability, and reproducibility of the test methods. Among other things, AHRI 390–2021 maintains the existing efficiency metrics—EER for cooling mode and COP for heating mode—but it also added a seasonal efficiency metric that includes part-load cooling performance—the Integrated Energy Efficiency Ratio (IEER). In November 2022, DOE issued a Test Procedure Final Rule for SPVUs that amended the test procedures for SPVUs to incorporate by reference AHRI 390–2021. As discussed in section III.C of this document, DOE has determined that the IEER metric is more representative of the cooling efficiency for SPVUs on an annual basis than the current EER metric. As a result, DOE is proposing to amend the standards for SPVUs to be based on the seasonal cooling metric, IEER, and the existing heating metric, COP. As discussed in section IV of this document, DOE conducted a crosswalk analysis to develop IEER levels that are of equivalent stringency to the current EER standard levels.[3]

To satisfy its review obligations under EPCA's 6-year-lookback provision, DOE analyzed the technological feasibility of more energy-efficient SPVUs. For those SPVUs for which DOE determined higher standards to be technologically feasible, DOE evaluated whether higher standards would be economically justified by conducting life-cycle cost (LCC) and payback period (PBP)

[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), which reflect the last statutory amendments that impact parts A and A–1 of EPCA.

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

[3] EPCA provides that in the case of any amended test procedure where DOE deviates from the industry test standard referenced in ASHRAE Standard 90.1, DOE must determine, to what extent, if any, the proposed test procedure would alter the measured energy efficiency, measured energy use, or measured water use of the subject ASHRAE equipment as determined under the existing test procedure. (*See* 42 U.S.C 6293(e); 42 U.S.C. 6314(a)(4)(C)) DOE refers to this as the ''crosswalk'' analysis.

analyses. As discussed in the following sections, DOE has tentatively determined that it lacks the clear and convincing evidence required under the statute to show that amended standards would be economically justified. DOE did not conduct a national impact analysis to measure the national energy savings of higher efficiency levels, because the weighted average LCC savings were strongly negative across the four equipment classes.

Based on the results of the analyses conducted, summarized in section VI of this document, DOE has tentatively determined that it lacks clear and convincing evidence that amended standards for SPVUs, in terms of IEER and COP, that are more stringent than the current standards for SPVUs would be economically justified. The clear and convincing threshold is a heightened standard and would only be met where the Secretary has an abiding conviction, based on available facts, data, and DOE's own analyses, that it is highly probable an amended standard would result in a significant additional amount of energy savings, and is technologically feasible and economically justified. *See American Public Gas Association* v. *U.S. Dep't of Energy,* No. 20–1068, 2022 WL 151923, at *4 (D.C. Cir. Jan. 18, 2022) (citing *Colorado* v. *New Mexico,* 467 U.S. 310, 316, 104 S.Ct. 2433, 81 L.Ed.2d 247 (1984)). DOE did not conduct the shipments analysis, manufacturer impact analysis, and other such analyses typically conducted at the NOPR stage due to the results of the initial analysis conducted (discussed in further detail elsewhere in this document).

In this NOPR/NOPD, DOE is proposing to adopt standards based on IEER and COP that are of equivalent stringency as the current DOE energy conservation standard levels and the current standard levels specified in ASHRAE Standard 90.1–2019. The proposed standards are presented in Table I–1. These proposed standards, if adopted, would apply to all SPVUs listed in Table I–1 manufactured in, or imported into, the United States starting on the tentative compliance date of 360 days after the publication in the **Federal Register** of the final rule for this rulemaking. *See* section VI.B of this NOPR/NOPD for a discussion on the applicable lead-times considered to determine this compliance date.

TABLE I–1—PROPOSED ENERGY CONSERVATION STANDARDS FOR SPVUS

Equipment class	Proposed standard level
SPVAC <65,000 Btu/h	IEER = 12.5
SPVHP <65,000 Btu/h	IEER = 12.5 COP = 3.3
SPVAC ≥65,000 Btu/h and <135,000 Btu/h.	IEER = 10.3
SPVHP ≥65,000 Btu/h and <135,000 Btu/h.	IEER = 10.3 COP = 3.0
SPVAC ≥135,000 Btu/h and <240,000 Btu/h.	IEER = 11.2
SPVHP ≥135,000 Btu/h and <240,000 Btu/h.	IEER = 11.2 COP = 3.0

II. Introduction

The following section briefly discusses the statutory authority underlying this proposal, as well as some of the relevant historical background related to the establishment of energy conservation standards for SPVUs.

A. Authority

EPCA, Pub. L. 94–163, as amended, among other things, authorizes DOE to regulate the energy efficiency of a number of consumer products and certain industrial equipment. Title III, part C 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 SPVUs, which are a category of small, large, and very large commercial package air conditioning and heating equipment and the subject of this document. (42 U.S.C. 6311(1)(B)–(D); 42 U.S.C. 6313(a)(10)) EPCA prescribed initial standards for these products. (42 U.S.C. 6313(a)(1)–(2)) Congress updated the standards for SPVUs through amendments to EPCA contained in the Energy Independence and Security Act of 2007 (EISA 2007), Public Law 110–140 (Dec. 19, 2007). (42 U.S.C. 6313(a)(10)) Additionally, DOE is triggered to consider amending the energy conservation standards for certain types of commercial and industrial equipment, including the equipment at issue in this document, whenever ASHRAE amends the standard levels or design requirements prescribed in ASHRAE/IES Standard 90.1, and independent of that requirement, a separate provision of EPCA requires DOE to consider amended standards for that equipment at a minimum, every six years. (42 U.S.C. 6313(a)(6)(A)–(C))

The energy conservation program under EPCA consists essentially of four parts: (1) testing; (2) labeling; (3) the establishment of Federal energy conservation standards, and (4) certification and enforcement procedures. Relevant provisions of EPCA include definitions (42 U.S.C. 6311), energy conservation standards (42 U.S.C. 6313), test procedures (42 U.S.C. 6314), labeling provisions (42 U.S.C. 6315), and the authority to require information and reports from manufacturers (42 U.S.C. 6316; 42 U.S.C. 6296).

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 for particular State laws or regulations, in accordance with the procedures and other provisions set forth under EPCA. (42 U.S.C. 6316(b)(2)(D))

Under 42 U.S.C. 6314, EPCA sets forth the criteria and procedures DOE is required to follow when prescribing or amending test procedures for covered equipment. EPCA requires that any test procedures prescribed or amended under this section must be reasonably designed to produce test results which reflect energy efficiency, energy use, or estimated annual operating cost of a given type of covered equipment during a representative average use cycle and requires that test procedures not be unduly burdensome to conduct. (42 U.S.C. 6314(a)(2)) Manufacturers of covered equipment must use the Federal test procedures as the basis for: (1) certifying to DOE that their equipment complies with the applicable energy conservation standards adopted pursuant to EPCA (42 U.S.C. 6316(b); 42 U.S.C. 6296), and (2) making representations about the efficiency of that equipment (42 U.S.C. 6314(d)). Similarly, DOE uses these test procedures to determine whether the equipment complies with relevant standards promulgated under EPCA. The DOE test procedures for SPVUs appear at 10 CFR part 431, subpart F, appendices G and G1.

ASHRAE Standard 90.1 sets industry energy efficiency levels for small, large, and very large commercial package air-conditioning and heating equipment, packaged terminal air conditioners, packaged terminal heat pumps, warm air furnaces, packaged boilers, storage water heaters, instantaneous water heaters, and unfired hot water storage tanks (collectively referred to as

''ASHRAE equipment''). For each type of listed equipment, EPCA directs that if ASHRAE amends Standard 90.1, DOE must adopt amended standards at the new ASHRAE efficiency level, unless DOE determines, supported by clear and convincing evidence, that adoption of a more-stringent level would produce significant additional conservation of energy and would be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)) Under EPCA, DOE must also review energy efficiency standards for SPVUs every six years and either: (1) issue a notice of determination that the standards do not need to be amended as adoption of a more-stringent level is not supported by clear and convincing evidence; or (2) issue a notice of proposed rulemaking including new proposed standards based on certain criteria and procedures in subparagraph (B) of 42 U.S.C. 6313(a)(6). (42 U.S.C. 6313(a)(6)(C))

In deciding whether a more-stringent standard is economically justified, under either the provisions of 42 U.S.C. 6313(a)(6)(A) or 42 U.S.C. 6313(a)(6)(C), DOE must determine whether the benefits of the standard exceed its burdens. DOE must make this determination after receiving comments on the proposed standard, and by considering, to the maximum extent practicable, the following seven factors:

(1) The economic impact of the standard on manufacturers and consumers of equipment subject to the standard;

(2) The savings in operating costs throughout the estimated average life of the covered equipment in the type (or class) compared to any increase in the price, initial charges, or maintenance expenses for the covered equipment that are likely to result from the standard;

(3) The total projected amount of energy savings likely to result directly from the standard;

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

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

(6) The need for national energy conservation; and

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

(42 U.S.C. 6313(a)(6)(B)(ii)(I)–(VII))

Further, EPCA establishes a rebuttable presumption that an energy conservation standard is economically justified if the Secretary finds that the additional cost to the consumer of purchasing a product that complies with the standard will be less than three times the value of the energy (and, as applicable, water) savings during the first year that the consumer will receive as a result of the standard, as calculated under the applicable test procedure. (42 U.S.C. 6295(o)(2)(B)(iii)) However, while this rebuttable presumption analysis applies to most commercial and industrial equipment (42 U.S.C. 6316(a)), it is not a required analysis for ASHRAE equipment (42 U.S.C. 6316(b)(1)).

EPCA also contains what is known as an ''anti-backsliding'' provision, which prevents the Secretary from prescribing any amended standard that either increases the maximum allowable energy use or decreases the minimum required energy efficiency of a covered product. (42 U.S.C. 6313(a)(6)(B)(iii)(I)) Also, the Secretary may not prescribe an amended or new standard if interested persons have established by a preponderance of the evidence that the standard is likely to result in the unavailability in the United States in any covered product type (or class) of performance characteristics (including reliability), features, sizes, capacities, and volumes that are substantially the same as those generally available in the United States. (42 U.S.C. 6313(a)(6)(B)(iii)(II)(aa))

B. Background

1. Current Standards

In a final rule published in the **Federal Register** on September 23, 2015 (September 2015 Final Rule), DOE prescribed the current energy conservation standards for SPVUs in accordance with the 3-year review prescribed by EPCA and in response to the 2013 update to ASHRAE Standard 90.1 (ASHRAE Standard 90.1–2013). 80 FR 57438. As part of the September 2015 Final Rule, DOE evaluated whether more-stringent standards for SPVUs were economically justified consistent with the requirements in EPCA at 42 U.S.C. 6313(a)(6)(B)(ii)(I)–(VII). For four of the six SPVU equipment classes, DOE adopted the levels specified in ASHRAE Standard 90.1–2013. 80 FR 57438, 57439 (Sept. 23, 2015). For the remaining two equipment classes, DOE concluded that there was clear and convincing evidence that standards more stringent than the levels in ASHRAE Standard 90.1–2013 were technologically feasible and economically justified and would save a significant additional amount of energy. *Id.* The current energy conservation standards are codified at 10 CFR 431.97 and are set forth in Table II–1.

TABLE II–1—FEDERAL ENERGY CONSERVATION STANDARDS FOR SPVUS

Equipment type	Cooling capacity	Sub-category	Efficiency level	Compliance date: products manufactured on and after . . .
Single package vertical air conditioners and single package vertical heat pumps, single-phase and three-phase.	<65,000 Btu/h	AC	EER = 11.0	September 23, 2019.
		HP	EER = 11.0 COP = 3.3	September 23, 2019.
Single package vertical air conditioners and single package vertical heat pumps.	≥65,000 Btu/h and <135,000 Btu/h.	AC	EER = 10.0	October 9, 2015.
		HP	EER = 10.0 COP = 3.0	October 9, 2015.
Single package vertical air conditioners and single package vertical heat pumps.	≥135,000 Btu/h and <240,000 Btu/h.	AC	EER = 10.0	October 9, 2016.
		HP	EER = 10.0 COP = 3.0	October 9, 2016.

ASHRAE Standard 90.1 has been updated on several occasions since the 2013 version, the most recently being released on October 24, 2019 (*i.e.,* ASHRAE 90.1–2019). The standard levels for SPVUs were revised in ASHRAE 90.1–2019 to match the current DOE standard levels.

2. History of the Current Energy Conservation Standards Rulemaking for SPVUs

On April 24, 2020, DOE published in the **Federal Register** a request for information regarding energy conservation standards for SPVUs (April 2020 RFI). 85 FR 22958. The April 2020 RFI solicited information from the public to help DOE determine whether amended standards for SPVUs would result in significant additional energy savings and whether such standards would be technologically feasible and economically justified. DOE received comments in response to the April 2020 RFI from the interested parties listed in Table II–2.

TABLE II–2—APRIL 2020 RFI WRITTEN COMMENTS

Commenter(s)	Abbreviation	Docket No.	Commenter type
Air-Conditioning, Heating, & Refrigeration Institute	AHRI	9	Manufacturer Trade Association.
Appliance Standards Awareness Project, American Council for an Energy-Efficient Economy.	ASAP/ACEEE	11	Efficiency Advocacy Organizations.
GE Appliances, a Haier company	GE	7	Manufacturer.
Institute for Policy Integrity at New York University School of Law.	NYU	5	Educational Institution.
Lennox International Inc	Lennox	8	Manufacturer.
Northwest Energy Efficiency Alliance	NEEA	6	Efficiency Advocacy Organization.
Pacific Gas and Electric Company (PG&E), San Diego Gas and Electric (SDG&E), and Southern California Edison (SCE); collectively referred to as the California Investor-Owned Utilities.	CA IOUs	10	Utilities.

A parenthetical reference at the end of a comment quotation or paraphrase provides the location of the item in the public record.[4]

The following provides an overview of the public comments received on the April 2020 RFI. In general, AHRI recommended that DOE not amend the current minimum energy conservation standards for SPVUs. The commenter stated that DOE should wait until the revised edition of the industry test procedure for SPVUs has published and has been referenced in ASHRAE Standard 90.1. AHRI added that a crosswalk should be developed by testing and calculation using current baseline-efficiency SPVU equipment to establish the energy conservation standards using the new metric. (AHRI, No. 9 at p. 6)

The CA IOUs recommended DOE investigate increasing the baseline efficiency levels for SPVUs in conjunction with establishing standards and test procedures that incorporate part-load performance. Based on their analysis of DOE's Compliance Certification Database (CCD), the CA IOUs noted that over 70 percent of products in each SPVU equipment class are at the minimum efficiency level, but many products have varied features and compressor configurations that are likely to translate into differences in part-load performance. Based on this, the CA IOUs encouraged DOE to consider shifting to a more-stringent, full-load metric. (CA IOUs, No. 10 at p. 2)

ASAP and ACEEE commented that greater energy savings are possible than those evaluated for the September 2015 Final Rule. ASAP and ACEEE argued that the most-efficient SPVU models currently available have either Energy Efficiency Ratio (EER) or COP ratings that are higher than the max-tech levels considered in the September 2015 Final Rule. (ASAP/ACEEE, No. 11 at pp. 1–2)

As discussed in section III.C of this document, DOE has amended its test procedures for SPVUs to incorporate by reference the updated industry test procedure, AHRI Standard 390–2021, ''Performance Rating of Single Package Vertical Air-Conditioners and Heat Pumps'' (AHRI 390–2021), which includes the existing efficiency metrics—EER for cooling mode and COP for heating mode—but it also adds a cooling-mode seasonal metric that includes part-load cooling performance—the IEER metric. Accordingly, DOE is proposing to amend the energy conservation standards for SPVUs to be based on the seasonal cooling metric, IEER, and the existing heating metric, COP. As discussed in section IV of this document, DOE conducted a crosswalk analysis in collaboration with AHRI and SPVU manufacturers to translate the current SPVU standard levels based on EER to the new metric, IEER, to establish baseline efficiency levels for the current analysis considering the potential for more-stringent SPVU standard levels.

C. Deviation From Appendix A

In accordance with section 3(a) of 10 CFR part 430, subpart C, appendix A (appendix A), ''Procedures, Interpretations, and Policies for Consideration of New or Revised Energy Conservation Standards and Test Procedures for Consumer Products and Certain Commercial/Industrial Equipment,'' DOE notes that it is deviating from the provision in appendix A regarding the NOPR/NOPD stages for an energy conservation standards rulemaking. *See* 86 FR 70892 (Dec. 13, 2021).

Section 8(d)(1) of appendix A states that the Department will finalize amended test procedures 180 days prior to the close of the comment period of a NOPR proposing new or amended standards or a notice of proposed determination that standards do not need to be amended. For the reasons that follow, DOE finds it necessary and appropriate to deviate from this step in appendix A by publishing this NOPR/NOPD such that the comment period will end before 180 days has elapsed from the publication of the test procedure final rule. As discussed in a final rule pertaining to Procedures, Interpretations, and Policies for Consideration in New or Revised Energy Conservation Standards and Test Procedures for Consumer Products and Commercial/Industrial Equipment, the 180-day period may not always be necessary. As an example, DOE noted

[4] The parenthetical reference provides a reference for information located in the docket of DOE's rulemaking to develop energy conservation standards for SPVUs. (Docket Number: EERE–2019–BT–STD–0033, which is maintained at *www.regulations.gov*). The references are arranged as follows: (commenter name, comment docket ID number, page of that document).

that it will typically use an industry test procedure as the basis for a new DOE test procedure. If DOE adopts the industry test procedure without modification, stakeholders should already be familiar with the test procedure. In such cases, requiring the new test procedure to be finalized 180 days prior to the close of the comment period for a NOPR proposing new energy conservation standards would offer little benefit to stakeholders while delaying DOE's promulgation of new energy conservation standards. 86 FR 70892, 70896 (Dec. 13, 2021). In this analogous case, DOE is deviating from the 180-day provision because it has incorporated by reference the industry consensus test procedure for SPVUs, AHRI 390–2021. DOE also notes that AHRI 390–2021 was published in June 2021, so DOE expects that manufacturers are already familiar with the test procedure.

III. General Discussion

DOE developed this proposal after considering oral and written comments, data, and information from interested parties that represent a variety of interests. The following discussion addresses issues raised by these commenters.

A. Scope of Coverage

EPCA, as amended by the EISA 2007 defines ''single package vertical air conditioner'' and ''single package vertical heat pump'' at 42 U.S.C. 6311(22) and (23), respectively. In particular, single package vertical air conditioners can be single- or three-phase; must have major components arranged vertically; must be an encased combination of components; and must be intended for exterior mounting on, adjacent interior to, or through an outside wall. Single package vertical heat pumps are single package vertical air conditioners that use reverse cycle refrigeration as their primary heat source and may include secondary supplemental heating by means of electrical resistance, steam, hot water, or gas. DOE codified the statutory definitions into its regulations at 10 CFR 431.92. Additionally, EPCA established initial equipment classes and energy conservation standards for SPVUs based on cooling capacity, and for those SPVUs with a capacity less than 65,000 Btu/h, also based on phase. (42 U.S.C. 6313(a)(10)(A)(i)–(ii) and (v)–(vi))

DOE defines an SPVAC as air-cooled commercial package air conditioning and heating equipment that: (1) is factory-assembled as a single package that: (i) has major components that are arranged vertically; (ii) is an encased combination of cooling and optional heating components; and (iii) is intended for exterior mounting on, adjacent interior to, or through an outside wall; (2) is powered by a single-phase or three-phase current; (3) may contain one or more separate indoor grilles, outdoor louvers, various ventilation options, indoor free air discharges, ductwork, well plenum, or sleeves; and (4) has heating components that may include electrical resistance, steam, hot water, or gas, but may not include reverse cycle refrigeration as a heating means. 10 CFR 431.92. Additionally, DOE defines an SPVHP as a single package vertical air conditioner that: (1) uses reverse cycle refrigeration as its primary heat source; and (2) may include secondary supplemental heating by means of electrical resistance, steam, hot water, or gas. *Id.* The Federal test procedures are applicable to SPVUs with a cooling capacity less than 760,000 Btu/h. (42 U.S.C. 6311(8)(D)(ii)) DOE currently only prescribes energy conservation standards for SPVUs less than 240,000 Btu/h (see section III.B of this document for details).

As part of the April 2020 RFI, DOE requested commented on whether the definitions for SPVUs should be revised. 80 FR 22958, 22961 (April 24, 2020). On that topic, AHRI commented that the definitions of SPVAC and SPVHP generally remain appropriate and did not suggest any modifications. (AHRI, No. 9 at p. 3)

As part of the most recent energy conservation standards rulemaking for SPVUs, DOE published a notice of data availability in the **Federal Register** on April 11, 2014 (April 2014 NODA). 79 FR 20114. In the April 2014 NODA, DOE noted that ASHRAE Standard 90.1–2013 created a new equipment class for SPVACs and SPVHPs used in space-constrained and replacement-only applications, with a definition for ''nonweatherized space constrained single-package vertical unit'' and efficiency standards for the associated equipment class. *Id.* at 79 FR 20121–20122. In the April 2014 NODA, DOE tentatively concluded that there was no need to establish a separate space-constrained class for SPVUs, given that certain models listed by manufacturers as SPVUs, most of which would meet the ASHRAE space-constrained definition, were being misclassified and should have been classified as central air conditioners (in most cases, space-constrained central air conditioners). *Id.* at 79 FR 20122–20123. DOE reaffirmed this position in the NOPR published in the **Federal Register** on December 30, 2014 NOPR (December 2014 NOPR). 79 FR 78614, 78625–78627. In response to the December 2014 NOPR, DOE received several comments from stakeholders related to the classification of products that these commenters are referring to as space-constrained SPVUs, the statutory definition of SPVU, how these products are applied in the field or specified for purchase, and whether the products warranted a separate equipment class within SPVU. In the final rule published in the **Federal Register** on September 23, 2015, DOE stated that it would consider those comments and take appropriate action in a separate rulemaking. 80 FR 57438, 57448. In response to the April 2020 RFI, Lennox commented that this remains an important outstanding issue for resolution in order to ensure that current products and new entries to the market are treated equitably. (Lennox, No. 8 at pp. 1–2)

In November 2022, DOE issued a final rule to amend the test procedure for SPVUs (the November 2022 Test Procedure Final Rule).[5] As part of the November 2022 Test Procedure Final Rule, DOE added specific definitions for ''single-phase single package vertical air conditioner with cooling capacity less than 65,000 Btu/h'' and ''single-phase single package vertical heat pump with cooling capacity less than 65,000 Btu/h'' to explicitly delineate such equipment from certain covered consumer products, such as central air conditioners, based on design characteristics. DOE defined this equipment as SPVACs and SPVHPs that are either: (1) weatherized, or (2) non-weatherized and have the ability to provide a minimum of 400 CFM of outdoor air. As discussed in the November 2022 Test Procedure Final Rule, single-phase single package products with cooling capacity less than 65,000 Btu/h not meeting these definitions would be properly classified as consumer central air conditioners, not commercial SPVUs.

B. Equipment Classes

EISA 2007, Public Law 110–140, amended EPCA in relevant part by establishing equipment classes and minimum energy conservation standards for SPVUs. (42 U.S.C. 6313(a)(10)(A)) In doing so, the EISA 2007 amendments established Federal energy conservation standards for SPVUs at levels that generally corresponded to the levels in the 2004 edition of the American Society of Heating, Refrigerating and Air-

[5] The November 2022 Test Procedure Final Rule is available at: *https://www1.eere.energy.gov/buildings/appliance_standards/standards.aspx?productid=30.*

Conditioning Engineers (ASHRAE) Standard 90.1, *Energy Standard for Buildings Except Low-Rise Residential Buildings* (*i.e.,* ASHRAE Standard 90.1–2004). On March 23, 2009, DOE published a final rule technical amendment in the **Federal Register** that codified the statutory equipment classes and energy conservation standards for SPVUs into DOE's regulations in the Code of Federal Regulations (CFR) at 10 CFR 431.97. 74 FR 12058, 12073–12074. EPCA generally directs DOE to adopt the equipment class structure for SPVUs from ASHRAE Standard 90.1. (*See* 42 U.S.C. 6313(a)(6)(A)(i)) For SVPUs, the current energy conservation standards specified in 10 CFR 431.97 are based on six equipment classes [6] determined according to the following: (1) cooling capacity and (2) whether the equipment is an air conditioner or a heat pump. These equipment classes are identical to those described in ASHRAE Standard 90.1.

TABLE III–1—SPVU EQUIPMENT CLASSES

	Equipment class
1	SPVAC <65,000 Btu/h.
2	SPVHP <65,000 Btu/h.
3	SPVAC ≥65,000 Btu/h and <135,000 Btu/h.
4	SPVHP ≥65,000 Btu/h and <135,000 Btu/h.
5	SPVAC ≥135,000 Btu/h and <240,000 Btu/h.
6	SPVHP ≥135,000 Btu/h and <240,000 Btu/h.

C. Test Procedure and Efficiency Metrics

EPCA sets forth generally applicable criteria and procedures for DOE's adoption and amendment of test procedures. (42 U.S.C. 6314(a)) Manufacturers of covered equipment must use these test procedures to certify to DOE that their equipment complies with energy conservation standards and to quantify the efficiency of their equipment. DOE's current energy conservation standards for SPVUs are expressed in terms of the full-load cooling metric, EER, and the heating metric, COP. (*See* 10 CFR 431.97(d)(3))

ASHRAE 90.1–2019 references, as the test procedure for SPVUs, ANSI/AHRI 390–2003, which does not include a seasonal efficiency metric for cooling mode. At the time of the April 2020 RFI, DOE's test procedure for SPVUs also incorporated by reference ANSI/AHRI 390–2003, omitting section 6.4. Hence, DOE's test procedure for SPVUs at that time likewise did not include a seasonal metric that accounted for part-load performance.

In response to the April 2020 RFI, NEEA, the CA IOUs, and ASAP/ACEEE commented that the existing SPVUs test procedure using the full-load EER metric does not account for the energy savings from variable-speed fans, multi-stage compressors, electronic expansion valves, and other technologies, and that there would likely be significant energy savings potential if a part-load metric were to be used. (NEEA, No. 6 at p. 2; CA IOUs, No. 10 at p. 1; ASAP/ACEEE, No. 11 at pp. 1, 2) NEEA and the CA IOUs commented that nearly 25 percent of units in the AHRI Directory of Certified Product Performance are rated with the integrated part-load value (IPLV) metric (in addition to EER), which considers part-load efficiency. (NEEA, No. 6 at pp. 2–3; CA IOUs, No. 10 at pp. 1–2) NEEA commented that there is a significant range in IPLV values for units available on the market (from approximately 13.5 to 17 IPLV), whereas EER only ranges from 11 to 12.5, with most units at the minimum of 11 EER. (NEEA, No. 6 at pp. 2–3) NEEA, the CA IOUs, and ASAP/ACEEE recommended that DOE should amend the test procedure for SPVUs to consider part-load performance so as to better represent performance during an average use cycle. (NEEA, No. 6 at p. 3; CA IOUs, No. 10 at p. 2; ASAP/ACEEE, No. 11 at p. 1)

The CA IOUs added that while part-load performance is key to representing an average use cycle, full-load performance is critical for enabling utilities to effectively manage grid services. The CA IOUs expressed support for a regulatory model in which both full-load EER and part-load efficiency are published in the AHRI database. (CA IOUs, No. 10 at p. 2)

AHRI and GE commented at the time of the April 2020 RFI that the industry, in collaboration with DOE, was in the process of finalizing a revised test procedure for SPVUs that adopts a seasonal cooling mode metric, IEER. (AHRI, No. 9 at p. 2; GE, No. 7 at p. 2) AHRI stated that any proposal to change the SPVU efficiency metric should be developed through the ASHRAE Standard 90.1 process. (AHRI, No. 9 at p. 2; GE, No. 7 at p. 2)

In response to these comments, DOE notes that as part of the November 2022 Test Procedure Final Rule, the Department amended its test procedure for SPVUs to incorporate by reference AHRI 390–2021, the latest version of the relevant industry standard. Among other things, AHRI 390–2021 maintains the existing efficiency metrics—EER for cooling mode and COP for heating mode—but it also added a seasonal metric that includes part-load cooling performance—the IEER metric. As part of the November 2022 Test Procedure Final Rule, DOE added a new appendix G1 at 10 CFR part 431, subpart F, that includes the relevant test procedure requirements for SPVUs for measuring with updated cooling efficiency metric, IEER, and heating efficiency metric, COP. The relevant test procedure requirements for SPVUs for measuring the existing efficiency metrics, EER and COP were included in appendix G at 10 CFR part 431, subpart F. Beginning 360 days on or after the date of publication of the test procedure final rule in the **Federal Register,** manufacturers must use appendix G for compliance, but if manufacturers make voluntary representations with respect to the integrated energy efficiency ratio (IEER), such representations must be based on testing conducted in accordance with appendix G1. All manufacturers must use appendix G1 on and after the compliance date of any amended standards for single packaged vertical air conditioners and single package vertical heat pumps denominated in terms of IEER, as set forth in 10 CFR 431.97.

[6] Although EPCA divided SPVACs and SPVHPs with < 65,000 Btu/h cooling capacity into equipment classes based on the phase of the electrical power (*see* 42 U.S.C. 6313(a)(10)(A)), it set the same energy conservation standards for both single-phase and three-phase equipment. DOE's current standards, as codified in 10 CFR 431.97, divide SPVU equipment into six equipment classes based on the cooling capacity and whether the equipment is an air conditioner or a heat pump, a class structure consistent with ASHRAE Standard 90.1.

DOE notes that SPVUs often operate at part-load (*i.e.,* less than designed full-load capacity) in the field, depending on the application and location. The current Federal metric for cooling efficiency, EER, captures the system performance at a single, full-load operating point (*i.e.,* single outdoor air temperature). As noted in section 6.2.2 of AHRI 390–2021, the full-load operating conditions (*i.e.,* 95 °F outdoor air dry-bulb temperature) accounts for only 1 percent of the time on average for SPVU applications. Hence, EER is not necessarily representative of energy efficiency over a full cooling season. In contrast, the IEER metric factors in the efficiency of operating at full-load conditions when outdoor temperature is high, as well as part-load conditions of 75-percent, 50-percent, and 25-percent of full-load capacity at outdoor temperatures appropriate for these load levels. This is accomplished by weighting the full- and part-load efficiencies with a representative average amount of time operating at each loading point. Under part-load conditions, SPVUs may cycle off/on, may operate at lower compressor stage levels, or (if they have variable-capacity compressors) may modulate capacity to match the cooling load. The test conditions and weighting factors for this IEER metric in AHRI 390–2021 were developed specifically for SPVUs based on an annual building load analysis and temperature data for buildings representative of SPVU installations, including modular classrooms, modular offices, and telecommunication shelters across 15 different climate zones.[7] Based on the weighting factors specified in section 6.2.2 of AHRI 390–2021, SPVUs spend a significant amount of time operating at milder outdoor air conditions with lower cooling loads. DOE's analysis also indicates that the efficiency at the milder part-load operating conditions can be significantly different than at the full-load operating conditions, and efficiency also can be significantly different between single-stage and two-stage units. The test conditions and weighting factors for the four load levels representing 100, 75, 50, and 25 percent of full-load capacity for SPVUs under the IEER metric are different than those used in the IEER metric in AHRI 340/360–2019, which were developed based on CUAC building types. For these reasons, DOE considers the IEER metric to be representative of the cooling efficiency for SPVUs on an annual basis, and more representative than the current EER metric. Accordingly, DOE is proposing to amend the standards for SPVUs to be based on the seasonal cooling metric, IEER, and the existing heating metric, COP.

DOE notes that the IPLV metric specified in AHRI 390–2003 integrates unit performance at each capacity step provided by the refrigeration system. However, the IPLV tests at each capacity step are all conducted at constant outdoor air conditions of 80 °F dry-bulb temperature and 67 °F wet-bulb temperature. As discussed, the IEER metric was developed considering climate data to reflect the outdoor temperatures representative of different load levels. As a result, DOE considers the IEER metric specified in AHRI 390–2021 to be more representative of annual energy use than the IPLV metric specified in AHRI 390–2003. DOE has determined, by clear and convincing evidence, that AHRI 390–2021 is more representative on annual energy use than AHRI 390–2003. As discussed, SPVUs often operate at part-load conditions. DOE notes that the IPLV metric specified in AHRI 390–2003 integrates unit performance at each capacity step provided by the refrigeration system. However, the IPLV tests at each capacity step are all conducted at constant outdoor air conditions of 80 °F dry-bulb temperature and 67 °F wet-bulb temperature. As discussed, the IEER metric was developed considering climate data to reflect the outdoor temperatures representative of different load levels. As a result, DOE considers the IEER metric specified in AHRI 390–2021 to be more representative of annual energy use than the IPLV metric specified in AHRI 390–2003.

NEEA and ASAP/ACEEE commented that DOE should also amend the test procedure for SPVUs to fully account for embedded fan energy use and revise the external static pressure requirements to accurately reflect field conditions. (NEEA, No. 6 at p. 1; ASAP/ACEEE, No. 11 at p. 1) ASAP/ACEEE also commented that DOE should incorporate defrost and reflect heating performance at lower ambient temperatures in the heating efficiency metric. (ASAP/ACEEE, No. 11 at pp. 1, 2) DOE has addressed all of these comments related to test procedure issues in the November 2022 Test Procedure Final Rule.

In the November 2022 Test Procedure Final Rule, DOE determined that it does not have sufficient information regarding the operation of fans outside of mechanical cooling and heating modes (*e.g.,* economizing, ventilation), regarding the installations for SPVHPs and the frequency of operation of defrost cycles, or regarding representative low ambient conditions during field use that would be necessary to develop representative testing procedures for these operating modes. DOE also determined that that it does not have information indicating that the current minimum ESPs are unrepresentative of field conditions.

D. Technological Feasibility

1. General

In each energy conservation standards rulemaking, DOE conducts a screening analysis based on information gathered on all current technology options and prototype designs that could improve the efficiency of the products or equipment that are the subject of the rulemaking. As the first step in such an analysis, DOE develops a list of technology options for consideration in consultation with manufacturers, design engineers, and other interested parties. DOE then determines which of those means for improving efficiency are technologically feasible. DOE considers technologies incorporated in commercially-available products or in working prototypes to be technologically feasible. *See generally* 10 CFR 431.4; 10 CFR part 430, subpart C, appendix A, sections 6(b)(3)(i) and 7(b)(1).

After DOE has determined that particular technology options are technologically feasible, it further evaluates each technology option in light of the following additional screening criteria: (1) practicability to manufacture, install, and service; (2) adverse impacts on product utility or availability; (3) adverse impacts on health or safety, and (4) unique-pathway proprietary technologies. *See generally* 10 CFR 431.4; 10 CFR part 430, subpart C, appendix A, sections 6(b)(3)(ii)–(v) and 7(b)(2)–(5). Section V.B of this document discusses the results of the screening analysis for SPVUs, particularly the designs DOE considered, those it screened out, and those that are the basis for the standards considered in this rulemaking. For further details on the screening analysis for this rulemaking, see chapter 4 of the NOPR/NOPD technical support document (TSD).

2. Maximum Technologically Feasible Levels

When DOE proposes to adopt an amended energy conservation standard for a type or class of covered equipment

[7] Based on EnergyPlus analysis developed for the previous energy conservation standards rulemaking for SPVUs. 80 FR 57438, 57462 (Sept. 23, 2015). EnergyPlus is a whole building energy simulation program (Available at: *http://apps1.eere.energy.gov/buildings/energyplus/*).

more stringent than the level in ASHRAE Standard 90.1, the Department must conduct the requisite analyses to show by clear and convincing evidence that such standard would result in significant additional conservation of energy and would be technologically feasible and economically justified. Under such analysis, DOE determines the maximum improvement in energy efficiency or maximum reduction in energy use that is technologically feasible for such equipment. (*See* 42 U.S.C. 6313(a)(6)(A)(ii)(II)) Accordingly, in the engineering analysis, DOE determined the maximum technologically feasible (max-tech) improvements in energy efficiency for SPVUs, using the design parameters for the most-efficient products available on the market or in working prototypes. The max-tech levels that DOE determined for this rulemaking are described in section V.C.1.b of this proposed rule and in chapter 5 of the NOPR/NOPD TSD.

E. Energy Savings

In determining whether standards for the subject equipment should be amended, DOE would typically determine whether such standards would result in significant additional conservation of energy, as required by 42 U.S.C. 6313(a)(6)(A)(ii)(II) and 42 U.S.C. 6313(a)(6)(C)(i). However, as discussed in section VI of this document, DOE has tentatively determined that amended standards for the subject equipment would not be economically justified. Because clear and convincing evidence of economic justification is necessary to adopt more-stringent standards for the subject equipment, DOE has tentatively concluded that quantification of energy savings from potential amended standards is not necessary in the case of this proposed rulemaking.

F. Economic Justification

As noted, EPCA provides seven factors to be evaluated in determining whether a potential amended energy conservation standard is economically justified. (42 U.S.C. 6313(a)(6)(B)(ii)(I)-(VII)) The following sections discuss how DOE has addressed each of those seven factors in this NOPR/NOPD.

1. Economic Impact on Consumers and Manufacturers

For individual consumers, DOE measures the economic impact by calculating the changes in LCC and PBP associated with new or amended energy conservation standards for the equipment in question. These measures are discussed further in the following section. For consumers in the aggregate, DOE also calculates the national net present value (NPV) of the consumer costs and benefits expected to result from particular standards. DOE also evaluates the impacts of potential standards on identifiable subgroups of consumers that may be affected disproportionately by a standard. However, DOE's analysis showed negative LCC savings for SPVUs for nearly all efficiency levels, and, therefore, DOE is not proposing to amend standards for SPVUs, because the Department anticipates that it would not have the clear and convincing evidence to support amended standards more stringent that those set forth in ASHRAE Standard 90.1. Accordingly, DOE did not conduct a consumer subgroup analysis or a national impact analysis for this NOPR/NOPD.

In determining the impacts of a potential standard on manufacturers, DOE typically conducts a manufacturer impact analysis (MIA). However, because DOE is tentatively unable to determine via clear and convincing evidence that a more-stringent standard level would result in significant additional conservation of energy and is technologically feasible and economically justified, DOE decided not to conduct an MIA. Nonetheless, DOE did examine the potential impacts of amended energy conservation standards for SPVUs on small manufacturers in its Regulatory Flexibility Act analysis, which is presented in section VII.B of this NOPR/NOPD. The following section discusses additional comments received from the April 2020 RFI regarding manufacturer impacts and cumulative regulatory burden.

In response to the April 2020 RFI, AHRI, Lennox, and GE urged DOE to consider the cumulative regulatory burden for heating, ventilation, air conditioning, and refrigeration (HVACR) manufacturers. (AHRI, No. 9 at p. 2; GE, No. 7 at p. 3; Lennox, No. 8 at p. 2) AHRI, Lennox, and GE argued that requirements for new low-GWP refrigerants will have a significant impact on the HVAC industry, and these commenters stated that in certain States, these requirements will take effect prior to the compliance date of any amended standards that would be adopted by DOE in the course of this proposed rulemaking. (AHRI, No. 9 at p. 5; GE, No. 7 at p. 3; Lennox, No. 8 at p. 2) AHRI stated that because nearly all of these new refrigerants have been designated flammable (A2L), all new safety standards have been developed that address the application of these new flammable refrigerants and subsequent leak mitigation. (AHRI, No. 9 at p. 5) AHRI stated that DOE's analysis should account for the challenge that manufacturers will face due to the need to develop, test, and certify two product lines for models with current refrigerants and new, A2L refrigerants. (*Id.*) AHRI and Lennox also noted that all current equipment will need to be tested to the new safety standard, Underwriters Laboratories/Canadian Standards Association (UL/CSA) Standard 60335–2–40, ''Standard for Household and Similar Electrical Appliances—Safety—Part 2–40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers,'' prior to its effective date of January 1, 2023. (AHRI, No. 9 at p. 5; Lennox, No. 8 at p. 3)

In addition to the cumulative burden concerns noted with refrigerants, AHRI stated that the industry is preparing for additional new efficiency metrics and standard levels for residential central air conditioners and heat pumps; small, large, and very large commercial package air conditioners and heat pump; and air-cooled, water-cooled, evaporatively-cooled; water-source unitary air conditioners and heat pumps; and variable refrigerant flow equipment. (AHRI, No. 9 at p. 2)

DOE notes that a full consideration of more-stringent levels, if undertaken, would assess manufacturer impacts, including cumulative burden. However, in the absence of proposing more-stringent standards, DOE has tentatively determined that the proposals set forth in this NOPR/NOPD would not be unduly burdensome to manufacturers.

For a more complete discussion of consumer impacts, see chapter 8 of the NOPR/NOPD TSD.

2. Savings in Operating Costs Compared To Increase in Price (LCC and PBP)

EPCA requires DOE to consider the savings in operating costs throughout the estimated average life of the covered equipment in the type (or class) compared to any increase in the price of, or in the initial charges for, or maintenance expenses of, the covered equipment that are likely to result from a standard. (42 U.S.C. 6313(a)(6)(B)(ii)(II)) DOE conducts this comparison in its LCC and PBP analysis.

The LCC is the sum of the purchase price of a product (including its installation) and the operating expense (including energy, maintenance, and repair expenditures) discounted over the lifetime of the product. The LCC analysis requires a variety of inputs, such as equipment prices (which includes manufacturer selling price, distribution channel markups, and sales tax), equipment energy consumption,

energy prices, maintenance and repair costs, equipment lifetime, discount rates appropriate for consumers, and the year that compliance with new or amended standards would be required. To account for uncertainty and variability in specific inputs, such as equipment lifetime and discount rate, DOE uses a distribution of values, with probabilities attached to each value.

The PBP is the estimated amount of time (in years) it takes consumers to recover the increased purchase cost (including installation) of more-efficient equipment through lower operating costs. DOE calculates the PBP by dividing the change in purchase cost due to a more-stringent energy conservation standard by the change in annual operating cost for the year that such standards are assumed to take effect.

For its LCC and PBP analysis, DOE assumes that consumers will purchase the covered equipment in the first year of compliance with new or amended energy conservation standards. The LCC savings for the considered efficiency levels are calculated relative to the case that reflects projected market trends in the absence of new or amended standards. DOE's LCC and PBP analysis is discussed in further detail in section V.F. of this document.

For a more complete discussion of the LCC and PBP analysis, see chapter 8 of the NOPR/NOPD TSD.

3. Energy Savings

Although significant additional conservation of energy is a separate statutory requirement for adopting an energy conservation standard, EPCA requires DOE, in determining the economic justification of a standard, to consider the total projected quantity of energy savings that are expected to result directly from the standard. (42 U.S.C. 6313(a)(6)(B)(ii)(III)) DOE is not proposing amended standards for SPVUs due to the negative LCC savings at nearly all efficiency levels, so, therefore, DOE did not project the total energy savings from higher efficiency levels.

4. Lessening of Utility or Performance of Equipment

In evaluating design options and the impact of potential standard levels, DOE evaluates potential amended energy conservation standards that would not lessen the utility or performance of the subject equipment. (42 U.S.C. 6313(a)(6)(B)(ii)(IV)) Because DOE is not proposing amended standards for SPVUs, the Department has tentatively concluded that this NOPR/NOPD would not impact the utility or performance of such equipment.

5. Impact of Any Lessening of Competition

EPCA directs DOE to consider the impact of any lessening of competition, as determined in writing by the Attorney General that is likely to result from a proposed standard. (42 U.S.C. 6313(a)(6)(B)(ii)(V)) Because DOE is not proposing standards for SPVUs more stringent than the current Federal standards for that equipment, DOE did not transmit a copy of its proposed determination to the Attorney General for anti-competitive review.

6. Need for National Energy Conservation

DOE also considers the need for national energy conservation in determining whether a new or amended standard is economically justified. (42 U.S.C. 6313(a)(6)(B)(ii)(VI)) Typically, energy savings from proposed standards would be likely to provide improvements to the security and reliability of the Nation's energy system, and reductions in the demand for electricity also may result in reduced costs for maintaining the reliability of the Nation's electricity system. DOE conducts a utility impact analysis to estimate how potential standards may affect the Nation's needed power generation capacity. However, because DOE is not proposing amended standards for SPVUs that increase stringency beyond the current Federal standard levels, the Department did not conduct this analysis for the present rulemaking.

DOE maintains that environmental and public health benefits associated with the more-efficient use of energy are important to take into account when considering the need for national energy conservation. Typically, proposed standards would be likely to result in environmental benefits in the form of reduced emissions of air pollutants and greenhouse gases (GHGs) associated with energy production and use. Therefore, DOE routinely conducts an emissions analysis to estimate how potential standards might affect these emissions. DOE also estimates the economic value of emissions reductions resulting from the considered TSLs (*i.e.,* standards above the base case). However, because DOE is not proposing amended standards for SPVUs at levels more stringent than the current Federal standard levels, the Department did not conduct this analysis for the present rulemaking.

7. Other Factors

In determining whether a potential energy conservation standard is economically justified, DOE may consider any other factors that the Secretary deems to be relevant. (42 U.S.C. 6313(a)(6)(B)(ii)(VII)) To the extent DOE identifies any relevant information regarding economic justification that does not fit into the other categories described previously, DOE could consider such information under ''other factors.'' DOE did not identify any other factors in this NOPR/NOPD.

IV. Crosswalk Analysis

As discussed in section II.B.1 of this document, DOE's current energy conservation standards for SPVUs are based on the full-load cooling efficiency metric, EER, and the heating efficiency metric, COP. As further discussed in section III.C of this document, DOE has amended the Federal test procedures for SPVUs to incorporate by reference AHRI 390–2021, including the seasonal cooling efficiency metric, IEER. Accordingly, DOE is proposing to amend the energy conservation standards for SPVUs to rely on the IEER metric for cooling efficiency (while retaining the COP metric for determining the heating efficiency of SPVHPs). As explained in section III.C of this document, DOE has tentatively determined that the IEER metric is representative of the cooling efficiency for SPVUs in terms of both an average use cycle and also on an annual basis, and that it is more representative than the current EER metric.

EPCA provides that in the case of any amended test procedure for covered ASHRAE equipment for which there is clear and convincing evidence to support deviation from the test procedure for such equipment referenced in ASHRAE Standard 90.1, DOE must determine, to what extent, if any, the proposed test procedure would alter the measured energy efficiency, measured energy use, or measured water use of the subject ASHRAE equipment as determined under the existing test procedure. (*See* 42 U.S.C 6293(e); 42 U.S.C. 6314(a)(4)(C)) If the Secretary determines that the amended test procedure will alter the measured efficiency or measured use, the Secretary shall amend the applicable energy conservation standard during the rulemaking carried out with respect to such test procedure. In such case, under the process prescribed in EPCA, DOE is directed to measure, pursuant to the amended test procedure, the energy efficiency or energy use of a

representative sample of covered products that minimally comply with the existing standard. (*See* 42 U.S.C. 6293(e)(2); 42 U.S.C. 6314(a)(4)(C)) The average of such energy efficiency or energy use determined under the amended test procedure constitutes the amended energy conservation standard for the applicable covered products. (*Id.*)

Pursuant to these statutory directives, DOE conducted a ''crosswalk'' analysis to translate the current SPVU standard levels based on EER to standard levels based on the new metric, IEER. DOE worked with AHRI and SPVU manufacturers (collectively referred to as the ''AHRI 390 Task Force'') to develop the crosswalk analysis, during which, both DOE and manufacturers conducted testing of minimally-compliant units. Pursuant to the requirements of EPCA (42 U.S.C. 6293(e)(2); 42 U.S.C. 6314(a)(4)(C)), the AHRI 390 Task Force conducted testing on a sample of minimally-compliant SPVUs. DOE observed instances where both single-stage and two-stage SPVUs are minimally compliant with the current EER standards because the full-load EER metric does not capture the benefits of part-load technologies. As discussed in section V.C of this document, two-stage units have higher efficiencies than single-stage units when using the seasonal IEER metric. As a result, the sample of minimally-compliant SPVUs selected for testing specifically focused on single-stage units, as these units are expected to be the least efficient under the amended SPVUs test procedure.

Collectively, the AHRI 390 Task Force conducted testing on 17 SPVUs with <65,000 Btu/h cooling capacity and 2 SPVUs with ≥65,000 Btu/h cooling capacity to measure the percentage change in efficiency between EER and IEER for each unit.[8] The test sample included a mix of both SPVACs and SPVHPs. Using these test data, the average percentage change was calculated for SPVUs <65,000 Btu/h cooling capacity and ≥65,000 Btu/h cooling capacity separately. Based on testing, SPVACs and SPVHPs showed the same percentage increase from EER to IEER. These test results are summarized in Table IV–1.

TABLE IV–1—AHRI 390 CROSSWALK TESTING RESULTS FOR MINIMALLY-COMPLIANT, SINGLE-STAGE SPVUS

Equipment class	Current minimum EER	Average percentage change from EER to IEER
SPVU <65,000 Btu/h	11	+13.4%
SPVU ≥65,000 Btu/h	10	+2.6%

Based on these test results, DOE is proposing baseline IEER levels that are 13.4 percent higher than current EER standard levels for SPVUs <65,000 Btu/h cooling capacity and 2.6 percent higher than the current EER standard levels for SPVUs ≥65,000 and <135,000 Btu/h cooling capacity. For SPVUs ≥135,000 and <240,000 Btu/h cooling capacity, DOE noted that there were only eight basic models currently available on the market. Based on review of product literature, all of these larger SPVU models operated with multiple compressor stages and staged airflow. The testing conducted as part of the AHRI 390 Task Force included only single stage units and, therefore, is not representative of the baseline IEER levels for these larger SPVU units currently available on the market. Consequently, in order to determine an appropriate baseline IEER level for these larger SPVU equipment classes, DOE applied the crosswalk of 2.6 percent, then applied the percent improvement in IEER associated with moving from single-stage compressor and airflow to multiple compressor stages and stage airflow, consistent with the improvement used for SPVUs <135,000 Btu/h cooling capacity (*i.e.,* a 9.6 percent increase in IEER, see section V.C.1.b of this document).

The proposed baseline efficiency levels for each equipment class, denominated in terms of IEER and COP (where appliable), are presented in Table IV–2. The methodology and results of the crosswalk analysis are presented in detail in the chapter 5 of the NOPR/NOPD TSD.

TABLE IV–2—CROSSWALKED BASELINE EFFICIENCY LEVELS

Subcategory	Current minimum standard levels	Proposed baseline efficiency levels*
SPVAC <65,000	EER = 11.0	IEER = 12.5.
SPVHP <65,000	EER = 11.0	IEER = 12.5.
	COP = 3.3	COP = 3.3.
SPVAC ≥65,000 and <135,000	EER = 10.0	IEER = 10.3.
SPVHP ≥65,000 and <135,000	EER = 10.0	IEER = 10.3.
	COP = 3.0	COP = 3.0.
SPVAC ≥135,000 and <240,000	EER = 10.0	IEER = 11.2.
SPVHP ≥135,000 and <240,000	EER = 10.0	IEER = 11.2.
	COP = 3.0	COP = 3.0.

* Reflects translation of existing energy conservation standards using a full-load EER cooling metric to a proposed equivalent energy conservation standard using a seasonal IEER metric.

Issue–1: DOE requests comment on the proposed baseline IEER levels for SPVUs, as well as comment on any aspect of its crosswalk analysis. DOE continues to seek information which compares EER to IEER for the SPVUs

[8] The percentage change from EER to IEER was used to ensure that data was anonymized for presentation to the AHRI 390 Task Force.

that are representative of the market baseline efficiency level for all equipment classes.

V. Methodology and Discussion of Related Comments

This section addresses the analyses DOE has performed for this proposed rulemaking with regard to SPVUs. Separate subsections address each component of DOE's analyses.

DOE used Python [9]-based analytical tools to estimate the impact of the potential energy conservation standards considered as part of this proposed rulemaking on consumers. These tools calculate the LCC savings and PBP of potential amended or new energy conservation standards for three consumer sectors: (1) schools, (2) offices, and (3) telecommunications structures. The LCC and PBP inputs, outputs, and summary tables are available for download in spreadsheet form at *https://www1.eere.energy.gov/buildings/appliance_standards/standards.aspx?productid=30.* DOE did not perform any analysis beyond the LCC, as the LCC results were negative for nearly all product classes, and, therefore, DOE tentatively determined that an increased standard level would not be economically justified.

A. Market and Technology Assessment

DOE develops information in the market and technology assessment that provides an overall picture of the market for the equipment concerned, including the purpose of the equipment, the industry structure, manufacturers, market characteristics, and technologies used in the equipment. This activity includes both quantitative and qualitative assessments, based primarily on publicly-available information. The subjects addressed in the market and technology assessment for this rulemaking include: (1) a determination of the scope of the rulemaking and product classes; (2) manufacturers and industry structure; (3) existing efficiency programs; (4) shipments information; (5) market and industry trends; and (6) technologies or design options that could improve the energy efficiency of SPVUs. The key findings of DOE's market assessment are summarized in the following sections. See chapter 3 of the NOPR/NOPD TSD for further discussion of the market and technology assessment.

1. Equipment Classes

As discussed in section III.B of this document, the current energy conservation standards for SPVUs specified in 10 CFR 431.97 are based on six equipment classes determined by: (1) cooling capacity and (2) whether the equipment is an air conditioner or a heat pump.

TABLE V–1—EQUIPMENT CLASSES FOR SPVUS

	Equipment class
1	SPVAC <65,000 Btu/h.
2	SPVHP <65,000 Btu/h.
3	SPVAC ≥65,000 Btu/h and <135,000 Btu/h.
4	SPVHP ≥65,000 Btu/h and <135,000 Btu/h.
5	SPVAC ≥135,000 Btu/h and <240,000 Btu/h.
6	SPVHP ≥135,000 Btu/h and <240,000 Btu/h.

In response to the April 2020 RFI, AHRI commented that it does not recommend any changes to the existing equipment classes. (AHRI, No. 9 at p. 3) DOE did not identify any performance-related features that would justify creating a new equipment class for SPVUs. Accordingly, DOE is proposing to maintain the existing equipment classes in this NOPR/NOPD.

In the April 2020 RFI, DOE requested comment on the availability of units on the market in the following equipment classes: SPVHP ≥65,000 Btu/h and <135,000 Btu/h, SPVAC ≥135,000 Btu/h and <240,000 Btu/h, and SPVHP ≥135,000 Btu/h and <240,000 Btu/h. 85 FR 22958, 22962 (April 24, 2020). At the time AHRI commented, that organization stated that the largest SPVHP in the AHRI Directory is 60,000 Btu/h and that the largest SPVAC is 146,000 Btu/h. (AHRI, No. 9 at p. 4) DOE conducted a more recent review of DOE's Compliance Certification Database,[10] and Table V–2 shows the number of models listed within the DOE Compliance Certification Database that DOE has identified for each class of SPVUs. Based on DOE's review of equipment currently available on the market, DOE determined that there are SPVHPs available up to 67,000 Btu/h and SPVACs up to 180,000 Btu/h. As discussed in section I of this document, DOE is not proposing to increase the stringency of the energy conservation standards for any SPVUs, including SPVHP ≥135,000 Btu/h and <240,000 Btu/h.

TABLE V–2—NUMBER OF MODELS UNDER CURRENT SPVU EQUIPMENT CLASSES

Cooling capacity range (Btu/h)	Number of models	
	SPVACs	SPVHPs
<65,000	467	303
≥65,000 and <135,000	43	2
≥135,000 and <240,000	8	0

2. Technology Options

In the technology assessment, DOE identifies technology options and prototype designs that appear to be feasible mechanisms for improving equipment efficiency. This assessment provides the technical background and structure on which DOE bases its screening and engineering analyses.

[9] Python is an open-source programming language. For more information, see: *www.python.org.*

[10] DOE's Compliance Certification Database can be found at *https://www.regulations.doe.gov/certification-data/products.html#q=Product_Group_s%3A** (Last accessed Feb. 16, 2022).

In the April 2020 RFI, DOE presented a preliminary list of technology options primarily based on the technologies identified in the most recent rulemaking for SPVUs (*i.e.,* the September 2015 final rule). 85 FR 22958, 22962 (April 24, 2020). In the April 2020 RFI, DOE requested comment on the technology options listed in Table V–3 regarding their applicability to the current market and how these technologies may impact the efficiency of SPVUs.

TABLE V–3—TECHNOLOGY OPTIONS PRESENTED IN APRIL 2020 RFI

	Technology options
Heat Exchanger Improvements	Increased Frontal Coil Area.
	Increased Depth of Coil.
	Microchannel Heat Exchangers.
	Dual Condensing Heat Exchangers.
Indoor Blower and Outdoor Fan Improvements	Improved Fan Motor Efficiency.
	Improved Fan Blades.
	Variable Speed Condenser Fan/Motor.
	Variable Speed Indoor Blower/Motor.
Compressor Improvements	Improved Compressor Efficiency.
	Multi-Speed Compressors.
Other Improvements	Thermostatic Expansion Valves.
	Electronic Expansion Valves.
	Thermostatic Cyclic Controls.

In response to the April 2020 RFI, AHRI and GE commented that since the last rulemaking, there are no new technology developments for SPVUs that are commercially available or that are not already accounted for in the existing EER metric. (AHRI, No. 9 at p. 4; GE, No. 7 at p. 2) AHRI added that all of the technology options presented in the April 2020 RFI (now listed in Table V–3), with the exception of increased coil size, are incorporated in minimum-efficiency equipment and would not increase SPVU efficiencies beyond the current levels. (AHRI, No. 9 at p. 7)

AHRI commented that in many replacement applications, the physical size of the replacement equipment cabinet is constrained by the original equipment size, particularly for classroom applications. (AHRI, No. 9 at p. 4) According to AHRI, cabinets project out into the room and are typically installed under windows, and as a result, the dimensions are limited in height by the window, in depth by the allowable projection into the floor space, and in length by the footprint of the original cabinet. (AHRI, No. 9 at p. 4) Therefore, AHRI commented that increasing heat exchanger size significantly is not possible in these cases and that appropriate boundaries must be established when considering increasing component sizes in the analysis, considering ASHRAE Standard 90.1's definition for non-weatherized space-constrained SPVU. (AHRI, No. 9 at pp. 4–5) AHRI added that SPVU manufacturers also need to be cognizant of product noise levels, particularly for classroom settings. AHRI stated that some SPVUs are installed within a cabinet in the room, which typically have sound limits, so all individual components and the combination of components in the final product are considered very carefully to achieve a quiet product. (AHRI, No. 9 at p. 8)

AHRI noted that SPVU manufacturers face limitations in terms of available compressor options; scroll compressors are not available below 17,000 Btu/h, so rotary compressors are employed. (AHRI, No. 9 at p. 8)

As discussed in section V.C.1 of this document, DOE conducted testing and physical teardowns on a sample of currently available SPVUs using the amended SPVU test procedure and based on the seasonal IEER metric. DOE supplemented this approach with a review of product literature for currently available models. Through such efforts, DOE identified technology options that are used in higher-efficiency equipment. Based on this review, DOE believes that the technology options identified for this NOPR/NOPD, as presented subsequently in Table V–5, are consistent with existing equipment on the market (*e.g.,* heat exchanger sizes, fan and fan motor types, controls, air flow) with consideration of the installation constraints noted by AHRI. DOE notes that where certain design options may increase cabinet sizes, DOE considered any additional costs associated with the installation of the equipment (*e.g.,* transition curbs to accommodate existing wall openings in replacement applications).

In the April 2020 RFI, DOE also noted that it did not consider improved fin design, improved tube design, and hydrophilic coating on fins in the engineering analysis for the previous rulemaking because they were commonly found in most baseline and higher-efficiency SPVUs. 85 FR 22958, 22963 (April 24, 2020). AHRI commented that SPVU manufacturers use the best commercially-available fin and tube designs in both baseline and higher-efficiency SPVUs. AHRI stated that hydrophilic film coating on fins are not used in SPVUs due to concern about degradation over time. (AHRI, No. 9 at p. 6) DOE maintains that improved fin and tube design are incorporated into baseline SPVUs and, as a result, DOE did not consider these as technology options in this NOPR/NOPD. DOE is unaware of publicly-available data quantifying the impact of hydrophilic film coating on fins or whether this is used in commercially-available equipment. As a result, DOE did not consider hydrophilic film coating as a technology option in this NOPR/NOPD.

Microchannel Heat Exchangers

As discussed in the April 2020 RFI, DOE did not evaluate microchannel heat exchangers for the September 2015 Final Rule engineering analysis because there was insufficient information regarding improvements to the overall system's energy efficiency. 85 FR 22958, 22962 (April 24, 2020); 80 FR 57438, 57455 (Sept. 23, 2015). On this topic, AHRI and GE agreed that there is insufficient information regarding microchannel heat exchangers impact on the overall system's energy efficiency, and, therefore, such technology should be excluded from the analysis. (AHRI, No. 9 at p . 5; GE, No. 7 at p. 2) GE added that microchannel heat exchangers are of limited usefulness as a technology option due to the constraints imposed by the architecture of the space in which they are installed (*i.e.,* the size of the exterior wall and the wall openings). (GE, No. 7 at p. 2) In light of these reasons, DOE

maintains that there is insufficient information regarding improvements to the overall system's energy efficiency for microchannel heat exchangers, and as a result, DOE did not consider them as a technology option for further consideration.

Part-Load Technology Options

In the April 2020 RFI, DOE noted that the test procedure for SPVUs at that time only measured efficiency at full-load steady-state conditions, while thermostatic expansion valves (TXVs), electronic expansion valves (EEVs), thermostatic cyclic controls, multi-speed compressors, variable speed condenser fan/motor and variable speed indoor blower/motor technologies only provide benefit at part-load conditions. 85 FR 22958, 22962–22963 (April 24, 2020).

AHRI commented that changing the efficiency metric to reflect part-load performance would change how these technology options impact the efficiency of SPVUs. AHRI stated that it does not support the inclusion of any technology option that does not impact efficiency using the current DOE test procedure. (AHRI, No. 9 at p. 5) AHRI commented that neither variable speed condenser fan/motors nor indoor blower/motors will impact efficiency using the existing EER metric and, therefore, should not be considered in this rulemaking. (AHRI, No. 9 at p. 5) The commenter argued that indoor blower/fan improvements will impact unit size, which can be problematic for space-constrained units. AHRI added that not all products have condenser fans to improve, specifically non-weatherized units. (*Id.*)

AHRI and GE commented that variable speed compressors, TXVs, and EEVs do not provide a benefit using the existing EER metric and, therefore, should not be considered in this rulemaking. (AHRI, No. 9 at pp. 5–6; GE, No. 7 at p. 2) AHRI commented that in the event that DOE amends the test procedure and efficiency metric for SPVUs to account for part-load performance, variable speed compressors still may not be a viable technology option due to cost and availability. AHRI and GE noted that SPVUs are designed to accommodate a wide variety of voltages but that currently available variable speed compressors that operate at lower capacities are designed for residential applications and voltages. Consequently, AHRI and GE argued that because variable speed compressors are not available that accommodate all commercial voltages, there is a limitation on the wide-scale adoption of variable speed equipment. (AHRI, No. 9 at p. 6; GE, No. 7 at p. 2) In addition, AHRI mentioned that compressor manufacturers are also working to develop full product lines to accommodate A2L refrigerants. AHRI commented that this effort requires significant research and design resources, so they do not expect timely availability of variable speed compressors for the full voltage range required for SPVUs. (AHRI, No. 9 at p. 6)

In response, as discussed in section III.C of this document, DOE has amended its test procedure for SPVUs to include a seasonal cooling efficiency metric that includes part-load performance, and, therefore, the Department is proposing to consider amended energy conservation standards based on the IEER metric in this NOPR/NOPD. As a result, DOE considered multi-speed compressors, TXVs, EEVs, thermostatic cyclic controls, variable speed condenser fan/motors, and variable speed indoor blower/motors as technology options, because these technologies improve the performance of SPVUs during part-load operation. However, based on DOE's testing, DOE does not have sufficient test data showing that variable-speed compressors provide a measurable improvement over two-stage compressors. As a result, DOE only considered two-stage compressors as a technology option for this NOPR/NOPD. DOE understands that two-stage compressors are available for the full range of cooling capacities for SPVUs. With regards to AHRI's comment that indoor blower/fan improvements will impact unit size and that not all products have condenser fans to improve, DOE notes that it considered application of these technology options consistent with existing equipment on the market.

Additionally, DOE is no longer considering improved compressor efficiency as a technology option, as the Department is not aware of any commercially-available compressors with improved efficiency that are used in SPVUs.

Refrigerants

Nearly all SPVUs are currently designed with R–410A as the refrigerant. The U.S. Environmental Protection Agency (EPA) Significant New Alternatives Policy (SNAP) Program evaluates and regulates substitutes for the ozone-depleting chemicals (such as air conditioning refrigerants) that are being phased out under the stratospheric ozone protection provisions of the Clean Air Act (CAA). (42 U.S.C. 7401 *et seq.*) [11] The EPA SNAP Program currently includes 31 [12] acceptable alternatives for refrigerants used in the new Residential and Light Commercial Air Conditioning class of equipment (which includes SPVUs),[13] On May 6, 2021, the EPA published a final rule in the **Federal Register** allowing the use of R–32, R–452B, R–454A, R–454B, R–454C, and R–457A, subject to use conditions. These refrigerants may now be used in commercial HVAC applications, but any listed available substitute for Residential and Light Commercial Air Conditioning may be used as a refrigerant in SPVU equipment. 86 FR 24444.

On December 27, 2020, the American Innovation and Manufacturing Act of 2020 was enacted in section 103 in Division S, Innovation for the Environment, of the Consolidated Appropriations Act, 2021 (Pub. L. 116–260; codified at 42 U.S.C. 7675). The American Innovation and Manufacturing Act of 2020 provides EPA specific authority to address hydrofluorocarbons (HFC), including to: (1) phase down HFC production and consumption of listed HFCs through an allowance allocation and trading program; (2) establish requirements for the management of HFCs and HFC substitutes in equipment (*e.g.,* air conditioners); and (3) facilitate sector-based transitions away from HFCs. (42 U.S.C. 7675(e), (h), (i)) Under the American Innovation and Manufacturing Act of 2020, EPA is also authorized to issue rules in response to petitions to establish sector-based HFC restrictions. (42 U.S.C. 7675(i)(3)) On October 14, 2021, EPA published a notice in the **Federal Register** which granted ten petitions in full, including one petition by AHRI *et al.,* titled ''Restrict the Use of HFCs in Residential and Light Commercial Air Conditioners'' (AHRI petition), in which the petitioners requested EPA to require residential and light commercial air conditioners (which includes SPVUs) to use refrigerants with GWP of 750 or less, with such requirement applying to these equipment manufactured after January

[11] Additional information regarding EPA's SNAP Program is available online at: *www.epa.gov/ozone/snap/* (Last accessed July 22, 2022).

[12] Refrigerant THR–03 is not included in this count because it is acceptable for use only in residential window air conditioners; Refrigerants R–1270 and R–443A were deemed unacceptable as of January 3, 2017; Refrigerants R–417C, R427–A and R–458A are only approved for retrofit applications.

[13] Information available at: *www.epa.gov/snap/substitutes-residential-and-light-commercial-air-conditioning-and-heat-pumps* (Last accessed July 22, 2022).

1, 2025, excluding variable refrigerant flow (VRF) equipment.[14] 86 FR 57141. DOE is also aware that the California Air Resources Board (CARB) finalized a rulemaking effective January 1, 2022, which prohibits the use of refrigerants with a GWP of 750 or greater starting January 1, 2023 in several new type of air-conditioning equipment, including SPVUs.[15]

In commenting on the April 2020 RFI, ASAP/ACEEE argued that alternatives to R410A such as R32, R452B, and R454B can improve efficiency by at least 5 percent[16] and that DOE should consider alternative refrigerants in its analysis. (ASAP/ACEEE, No. 11 at p. 2)

In response, DOE is aware of the changing landscape of refrigerants as they relate to SPVUs, particularly the AHRI petition that requested the EPA to require residential and light commercial air conditioners to use refrigerants with GWP of 750 or less, with such requirement applying to this equipment manufactured after January 1, 2025 (excluding VRF) and that was granted by EPA on October 14, 2021. 86 FR 57141 (Oct. 14, 2021).[17] In light of this AHRI petition which would impact SPVUs, DOE reviewed certain SNAP-approved substitutes that met this criterion for use of a refrigerant with GWP of 750 or less.[18] These are listed in Table V–4.

TABLE V–4—POTENTIAL SUBSTITUTES FOR HFCS IN NEW RESIDENTIAL AND LIGHT COMMERCIAL AIR CONDITIONING EQUIPMENT, WITH GWP OF 750 OR LESS

Approved substitute	GWP value	Approval date [1]	ASHRAE safety classification [2]
R–457A	140	May 6, 2021	A2L
R–454C	150		
R–454A	240		
R–454B	470		
R–32	675		
R–452B	700		

[1] Approved by EPA. 86 FR 24444.

[2] ASHRAE assigns safety classifications to the refrigerants based on toxicity and flammability data. The capital letter designates a toxicity class based on allowable exposure and the numeral denotes flammability. For toxicity, Class A denotes refrigerants of lower toxicity, and Class B denotes refrigerants of higher toxicity. For flammability, class 1 denotes refrigerants that do not propagate a flame when tested as per the standard; class 2 and 2L denotes refrigerants of lower flammability; and class 3, for highly flammable refrigerants such as the hydrocarbons.

DOE reviewed several studies[19] to gauge the potential efficiency improvements of the substitute refrigerants identified in Table V–4, as compared to R–410A. Most of these studies suggested comparable performance to R410A, with some studies showing slightly reduced efficiency and others showing improvement as high as six percent (for R–32). DOE notes that most of these studies were performed with drop-in applications (where an alternate refrigerant replaces the existing refrigerant in a system that is optimized for the existing refrigerant) and were not performed on SPVUs specifically. It is possible that these substitute refrigerants might show efficiencies higher than R–410A in specific applications that have been optimized for such refrigerants. However, given the uncertainty associated with the studies reviewed, DOE was unable to conclude with reasonable confidence that these refrigerants will result in a specific improvement in energy efficiency. Therefore, DOE has tentatively decided to not consider alternate refrigerants as a technology option for increasing SPVU efficiency. On the other hand, DOE does not expect that the anticipated refrigerant change will reduce SPVU efficiency. Also, as discussed in section III.F.1 of this NOPR, because DOE is not proposing amended standards for SPVUs that increase stringency beyond the current Federal standard levels, DOE did not assess the cumulative regulatory burden associated with potential refrigerant requirements.

NOPR/NOPD Technology Options

Based on the previous discussion, DOE identified nine technology options for this NOPR/NOPD, presented in Table V–5, that would be expected to improve the efficiency of SPVUs, as measured by the amended DOE test procedure.

TABLE V–5—NOPR/NOPD TECHNOLOGY OPTIONS

	Technology options
Heat Exchanger Improvements	Increased Frontal Coil Area.
	Increased Depth of Coil.
	Dual Condensing Heat Exchangers.
Indoor Blower and Outdoor Fan Improvements	Improved Fan Motor Efficiency.

[14] Available at: *www.regulations.gov/document/EPA-HQ-OAR-2021-0289-0011* (Last accessed July 22, 2022).

[15] Available at: *www.arb.ca.gov/rulemaking/2020/hfc2020* (Last accessed July 22, 2022).

[16] See *www.aceee.org/files/proceedings/2016/data/papers/3_406.pdf* (Last accessed July 22, 2022).

[17] After granting a petition, EPA must initiate a rulemaking and publish a final rule within two years of the petition grant date (*i.e.,* by Oct. 15, 2023).

[18] On December 29, 2021, EPA published in the **Federal Register** a notification informing the public that they would not be using a negotiated rulemaking procedure to develop a proposed rule or rules associated with the eleven American Innovation and Manufacturing Act of 2020 petitions (including the AHRI petition) but will instead use the typical notice-and-comment rulemaking process. 86 FR 74080.

[19] See: (1) *https://www.aceee.org/files/proceedings/2016/data/papers/3_406.pdf;*

(2) *https://core.ac.uk/download/pdf/4955522.pdf;*

(3) *https://docs.lib.purdue.edu/iracc/1211/;*

(4) *https://docs.lib.purdue.edu/iracc/1235/;*

(5) *https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=3097&context=icec;*

(6) *https://www.optimizedthermalsystems.com/images/pdf/about/An-Evaluation-of-R32-for-the-US-HVACR-Market.pdf;*

(7) *https://www.nature.com/articles/ncomms14476;*

(8) *https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=3089&context=iracc;*

(9) *https://www.osti.gov/biblio/1823375;* and

(10) *https://climate.emerson.com/documents/copeland-scroll-yp-compressors-designed-for-r32-en-gb-7125818.pdf.*

(All last accessed July 25, 2022).

TABLE V–5—NOPR/NOPD TECHNOLOGY OPTIONS—Continued

	Technology options
Compressor Improvements	Improved Fan Blades. Two-Stage Compressors.
Other Improvements	Thermostatic Expansion Valves. Electronic Expansion Valves. Thermostatic Cyclic Controls.

Issue–2: DOE requests comment on the proposed technology options for SPVUs. DOE also requests data on the potential improvement in IEER and COP associated with these technology options.

B. Screening Analysis

DOE uses the following five screening criteria to determine which technology options are suitable for further consideration in an energy conservation standards rulemaking:

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

(2) Practicability to manufacture, install, and service. If it is determined that mass production and reliable installation and servicing of a technology in commercial products could not be achieved on the scale necessary to serve the relevant market at the time of the projected compliance date of the standard, then that technology will not be considered further.

(3) Impacts on product utility or product availability. If it is determined that a technology would have a significant adverse impact on the utility of the product/equipment for significant subgroups of consumers or would result in the unavailability of any covered product type with performance characteristics (including reliability), features, sizes, capacities, and volumes that are substantially the same as products generally available in the United States at the time, it will not be considered further.

(4) Adverse impacts on health or safety. If it is determined that a technology would have significant adverse impacts on health or safety, it will not be considered further.

(5) Unique-Pathway Proprietary Technologies. If a design option utilizes proprietary technology that represents a unique pathway to achieving a given efficiency level, that technology will not be considered further due to the potential for monopolistic concerns.

10 CFR 431.4; 10 CFR part 430, subpart C, appendix A, sections 6(b)(3) and 7(b).

In summary, if DOE determines that a technology, or a combination of technologies, fails to meet one or more of the listed five criteria, it will be excluded from further consideration in the engineering analysis. The reasons for eliminating any technology are discussed in the following sections.

After a review of each technology, DOE tentatively concludes that all of the other identified technologies listed in Table V–5 of section V.A.3 of this document meet all five screening criteria to be examined further as design options in DOE's NOPR/NOPD analysis. In summary, DOE did not screen out the following technology options:

TABLE V–6—TECHNOLOGY OPTIONS RETAINED FOR ENGINEERING ANALYSIS

	Technology options
Heat Exchanger Improvements	Increased Frontal Coil Area. Increased Depth of Coil. Dual Condensing Heat Exchangers.
Indoor Blower and Outdoor Fan Improvements	Improved Fan Motor Efficiency. Improved Fan Blades.
Compressor Improvements	Two-Stage Compressors.
Other Improvements	Thermostatic Expansion Valves. Electronic Expansion Valves. Thermostatic Cyclic Controls.

DOE has initially determined that these technology options are technologically feasible because they are being used or have previously been used in commercially-available products or working prototypes. DOE also finds that all of these technology options meet the other screening criteria (*i.e.,* practicable to manufacture, install, and service and do not result in adverse impacts on consumer utility, product availability, health, or safety, and are not unique-pathway proprietary technologies). For additional details on DOE's screening analysis, see chapter 4 of the NOPR/NOPD TSD.

C. Engineering Analysis

The purpose of the engineering analysis is to establish the relationship between the efficiency and cost of SPVUs. There are two elements to consider in the engineering analysis: (1) the selection of efficiency levels to analyze (*i.e.,* the ''efficiency analysis'') and (2) the determination of equipment cost at each efficiency level (*i.e.,* the ''cost analysis''). In determining the performance of higher-efficiency equipment, DOE considers technologies and design option combinations not eliminated by the screening analysis. For each equipment class, DOE estimates the baseline cost, as well as the incremental cost for the equipment at efficiency levels above the baseline. The output of the engineering analysis is a set of cost-efficiency ''curves'' that are used in downstream analyses (*i.e.,* the LCC and PBP analyses and the NIA).

1. Efficiency Analysis

DOE typically uses one of two approaches to develop energy efficiency levels for the engineering analysis: (1) relying on observed efficiency levels in the market (*i.e.,* the efficiency-level approach), or (2) determining the incremental efficiency improvements associated with incorporating specific design options to a baseline model (*i.e.,* the design-option approach). Using the

efficiency-level approach, the efficiency levels established for the analysis are determined based on the market distribution of existing equipment (in other words, based on the range of efficiencies and efficiency level ''clusters'' that already exist on the market). Using the design-option approach, the efficiency levels established for the analysis are determined through detailed engineering calculations and/or computer simulations of the efficiency improvements from implementing specific design options that have been identified in the technology assessment. DOE may also rely on a combination of these two approaches. For example, the efficiency-level approach (based on actual products on the market) may be extended using the design option approach to ''gap fill'' levels (to bridge large gaps between other identified efficiency levels) and/or to extrapolate to the max-tech level (particularly in cases where the max-tech level exceeds the maximum efficiency level currently available on the market).

In this rulemaking, DOE relies on a design-option approach. Consistent with its previous rulemaking analysis, DOE focused the analysis on representative capacities for each equipment class. Based on market data, DOE identified representative cooling capacities for SPVACs and SPVHPs as presented in Table V–7. More specifically, DOE identified 36,000 Btu/h, 72,000 Btu/h, and 180,000 Btu/h as the nominal cooling capacities representing the most models in DOE's CCD for each SPVU equipment class.

TABLE V–7—SPVU EQUIPMENT CLASS REPRESENTATIVE COOLING CAPACITIES

Equipment class	Representative cooling capacity
SPVAC and SPVHP <65,000 Btu/h	36,000 Btu/h.
SPVAC and SPVHP ≥65,000 Btu/h and <135,000 Btu/h	72,000 Btu/h.
SPVAC and SPVHP ≥135,000 Btu/h and <240,000 Btu/h	180,000 Btu/h.

DOE initially considered the range of efficiencies available on the market based on the data provided in DOE's CCD for SPVUs for EER and COP, as shown in Figure V–1 and Figure V–2.

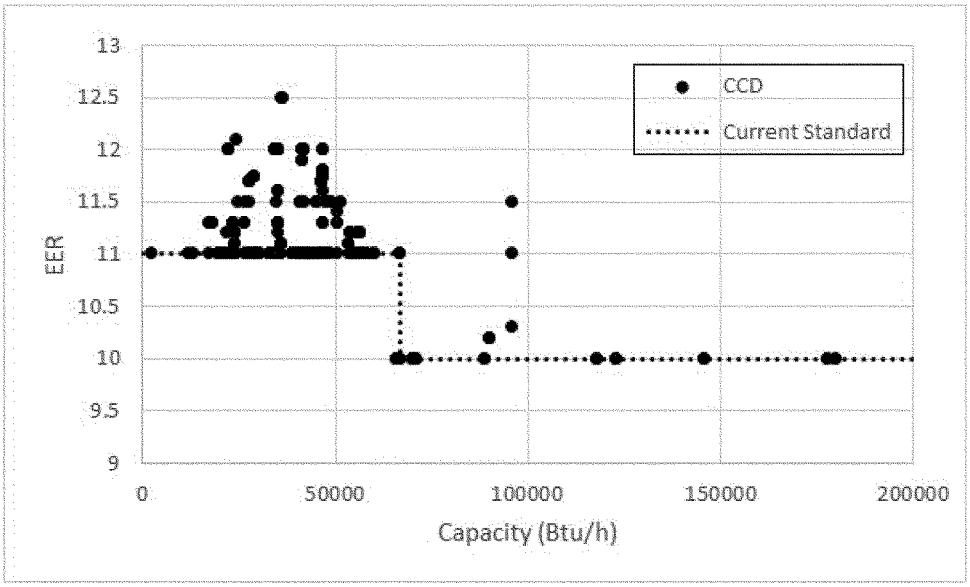

Figure V–1 DOE SPVu EER Compliance Certification Data

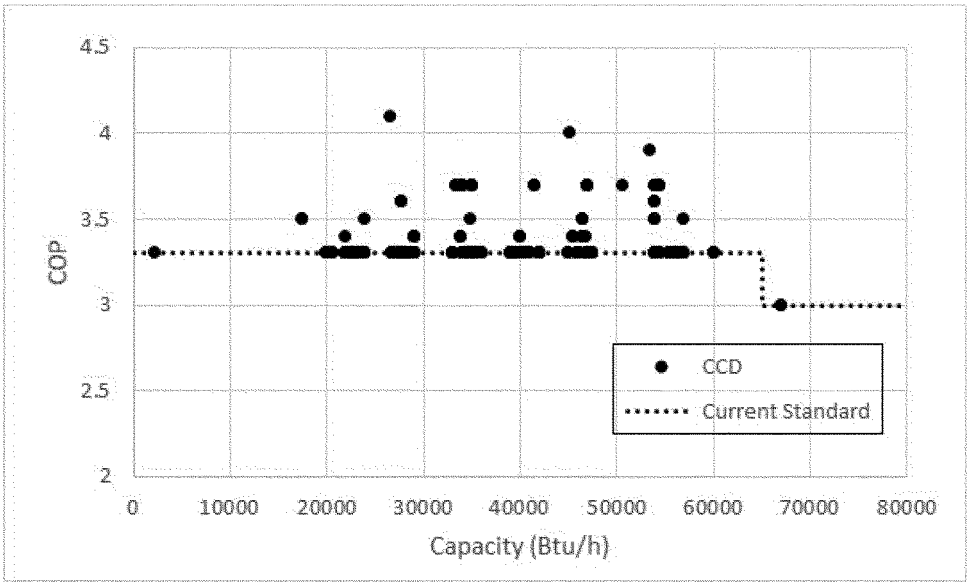

Figure V–2 DOE SPVu COP Compliance Certification Data

However, as discussed in section III.C of this document, DOE is now proposing to amend the energy conservation standards for SPVUs so as to be based on the seasonal cooling metric, IEER, and the existing heating metric, COP. Because SPVU manufacturers currently do not report IEER, DOE conducted testing on a sample of units that included a variety of the design options presented in Table V–6. The results of DOE's testing are presented in Table V–8. DOE used these test results along with additional information gathered using reverse engineering (*i.e.,* teardown) methodologies, information from manufacturer product literature, and consideration of the range of efficiencies based on EER in DOE's CCD, to evaluate the range of design options used for units available on the market at different efficiencies in support of developing efficiency levels for the NOPR/NOPD analysis. DOE anticipates that the test results are applicable to all equipment classes when considering the relative improvement in efficiency associated with various design options due to the similarity in platform design and cabinet construction for units across equipment classes.

TABLE V–8—DOE TEST RESULTS

Test unit	Equipment class	Rated cooling capacity (Btu/h)	Rated EER	Tested IEER	Cooling stages
1	AC <65,000 Btu/h	35,600	11.25	12.5	1
2	AC <65,000 Btu/h	35,000	11	11.6	2
3	HP <65,000 Btu/h	36,000	11.1	12.2	1
4	AC <65,000 Btu/h	36,000	12.5	13.2	2
5	AC <65,000 Btu/h	35,000	12	17.7	2
6	HP <65,000 Btu/h	35,000	11	11.7	1
7	HP <65,000 Btu/h	33,800	11	13.7	2
8	AC <65,000 Btu/h	54,000	11	16.1	2
9	HP <65,000 Btu/h	54,000	11.2	16.8	2
10	HP <65,000 Btu/h	57,000	11	12.7	2

a. Baseline Efficiency Levels

For each equipment class, DOE generally selects a baseline model as a reference point for each class, and measures any changes resulting from potential new or amended energy conservation standards against the baseline. The baseline model in each product/equipment class represents the characteristics of a product/equipment typical of that class (*e.g.,* capacity, physical size). Generally, a baseline model is one that just meets current energy conservation standards and provides basic consumer utility. If no standards are in place, the baseline is typically the most common or least-efficient unit on the market.

As part of the April 2020 RFI, DOE requested comment on appropriate baseline efficiency levels. 85 FR 22958, 22964 (April 24, 2020). On this topic, AHRI commented that DOE should use the current baseline efficiency levels for SPVACs ≥135,000 and <240,000 Btu/h cooling capacity, noting that there are only two models on the market and that it is doubtful these two models account for significant sales volume. (AHRI, No. 9 at p. 6)

As discussed in section IV of this document, DOE's current cooling mode efficiency standards for SPVUs are based on the full-load metric, EER. AHRI and DOE jointly developed a crosswalk from EER to IEER based on testing of a sample of minimally-compliant single-stage units. DOE considered these crosswalked IEER levels as the baseline cooling mode efficiency levels for this analysis. For

heating mode for SPVHPs, DOE considered the current COP standard levels as the baseline efficiency levels. The proposed baseline efficiency levels are shown in Table V–9.

TABLE V–9—BASELINE EFFICIENCY LEVELS

Equipment class	Current EER standard levels	Baseline IEER levels	Baseline COP levels
SPVAC <65,000 Btu/h	11.0	12.5	.....
SPVHP <65,000 Btu/h	11.0	12.5	3.3
SPVAC ≥65,000 Btu/h and <135,000 Btu/h	10.0	10.3	.....
SPVHP ≥65,000 Btu/h and <135,000 Btu/h	10.0	10.3	3.0
SPVAC ≥135,000 Btu/h and <240,000 Btu/h	10.0	11.2	.....
SPVHP ≥135,000 Btu/h and <240,000 Btu/h	10.0	11.2	3.0

Based on physical teardowns of units at the baseline efficiency levels, DOE noted that baseline units for the <65,000 Btu/h cooling capacity equipment classes and ≥65,000 and <135,000 Btu/h cooling capacity equipment classes had a single stage of compressor operation and indoor/outdoor fan speeds. These units used single-speed compressors, permanent-split capacitor (PSC) outdoor fan motors with single-stage outdoor airflow, and electronically-commutated indoor blower motors (ECM) with single-stage indoor airflow. For the ≥135,000 and <240,000 Btu/h cooling capacity equipment classes, as discussed in section V.C.1.b of this document, DOE notes that all units available on the market operated with multiple compressor stages and staged airflow, using multiple compressors along with ECM indoor blowers and outdoor fans. Therefore, DOE expects that all units on the market in this equipment class can meet the efficiency level proposed.

Issue–3: DOE requests comment on the proposed baseline efficiency levels and the design options associated with these levels.

b. Higher Efficiency Levels

As part of DOE's analysis, the maximum available efficiency level is the highest-efficiency unit currently available on the market. DOE also defines a ''max-tech'' efficiency level to represent the maximum possible efficiency for a given product. In many cases, the max-tech efficiency level is not commercially available because it is not economically feasible.

In the April 2020 RFI, DOE noted that in the previous energy conservation standards rulemaking for SPVUs for all equipment classes, DOE determined that the max-tech efficiency was the maximum available efficiency. Accordingly, DOE presented the maximum available efficiency levels using the full-load EER cooling efficiency metric and COP heating efficiency metric based on review of the DOE's CCD. DOE requested comment on appropriate max-tech efficiency levels based on EER and COP and the design options associated with these levels, as well as appropriate efficiency levels based on the seasonal efficiency metric. 85 FR 22958, 22964–22965 (April 24, 2020).

On this topic, AHRI commented that DOE should only consider currently-available technologies based on DOE's CCD for SPVUs as max-tech levels. AHRI stated that theoretical design-option approaches for max-tech levels should be avoided, as it precludes stakeholders from being able to accurately develop estimates for repair costs, predict failure modes associated with such design options, and predict costs associated with platform/design changes. (AHRI, No. 9 at p. 7) AHRI further commented that using the DOE test procedure (*i.e.,* the one available at the time of the April 2020 RFI), the max-tech efficiency level would be no different now than it was in DOE's 2015 standards rulemaking analysis. AHRI asserted that one of the only design options that would increase EER is increasing coil size, but the commenter cautioned that there are limitations on this design option due to constraints for through-the-wall or classroom replacement installations. According to AHRI, the incremental and maximum available efficiency levels and associated design options for each equipment class using a part-load energy efficiency metric would be substantially different than using a full-load metric, but the commenter argued that those matters can only be evaluated properly after the revised AHRI 390 has published. (AHRI, No. 9 at p. 7) DOE notes that as discussed in section III.C of this document, DOE is conducting this analysis with respect to the IEER metric published in AHRI 390–2021.

The CA IOUs commented that more-efficient models (based on EER) were added to the DOE's CCD for SPVUs since DOE's review in preparation for the April 2020 RFI, so DOE should update the maximum available efficiency levels. (CA IOUs, No. 10 at p. 3)

In response, for this NOPR/NOPD, DOE considered efficiency levels based on the seasonal cooling efficiency metric that includes part-load performance, IEER, and the heating efficiency metric, COP. For SPVUs <65,000 Btu/h cooling capacity, DOE developed incremental IEER and COP higher efficiency levels up to the max-tech level based on DOE's testing of a sample of units, review of manufacturer product literature, and consideration of the range of efficiencies observed in DOE's CCD for SPVUs based on EER. As discussed in section V.C.2 of this document, DOE conducted physical teardowns on the units in its test sample. This allowed DOE to identify the design options associated with units at different efficiencies. In selecting efficiency levels, DOE primarily focused on the representative cooling capacity for this equipment class of 36,000 Btu/h. DOE notes that this method does not rely on theoretical efficiencies, per AHRI's concern.

DOE identified the first efficiency level of 13.7 IEER for SPVUs with <65,000 Btu/h cooling capacity based on units that incorporated 2-speed compressors and 2-stage indoor airflow and control logic to provide staged compressor and airflow operation. In addition, DOE observed that units at this efficiency level incorporated an increase in indoor and outdoor heat exchanger total volume compared to baseline efficiency units. Based on DOE's test data and review of available product literature, DOE expects that 13.7 IEER represents the efficiency level that can be achieved without requiring a substantial increase in heat exchanger and cabinet redesign compared to baseline efficiency units. For the max-tech efficiency level, DOE found that units with tested cooling mode

efficiencies between 16.1 and 17.7 IEER covered both SPVACs and SPVHPs with cooling capacities at 35,000 Btu/h and 54,000 Btu/h. DOE noted that these units were built using the same platform/cabinet and similar design options. To ensure that all equipment across the range of cooling capacities within this equipment class can achieve the analyzed efficiency level, DOE selected 16.1 IEER as the max-tech efficiency level. DOE further noted that, in addition to the design changes to reach efficiency level 1, units at the max-tech efficiency level also incorporated substantially larger indoor and outdoor heat exchangers, along with higher horsepower indoor and outdoor blower/fan motors, which require an increase in cabinet size. DOE's findings on the increases in heat exchanger size align with AHRI's comments on the matter, in that at a certain point, increases in cabinet size would be necessary to accommodate increases in heat exchanger size. For heating mode, DOE used the rated COP values corresponding to the units in DOE's test sample at each IEER efficiency level.

For SPVUs with ≥65,000 and <135,000 Btu/h cooling capacity, DOE applied the same design changes and the equivalent percentage increase to reach efficiency level 1 as used for the <65,000 Btu/h cooling capacity equipment class (*i.e.,* a 9.6 percent increase in IEER). DOE notes that baseline IEER units, which were units with nominal cooling capacities of 72,000 Btu/h or less, had similar platform design and cabinet construction as units less than 65,000 Btu/h. Based on this, DOE preliminarily concluded that the percentage increase used for less than 65,000 Btu/h units to reach efficiency level 1 is also applicable to this equipment class. DOE noted that larger capacity units in this equipment class already incorporated staged compressor and airflow operation. As a result, DOE believes these units would be capable of meeting efficiency level 1. Efficiency level 1 represents the max-tech level for these two equipment classes.

For SPVUs with ≥135,000 and <240,000 Btu/h cooling capacity, DOE found that there are only a small number of basic models, all of which were rated at the baseline EER of 10.0. Per the discussion in section IV of this document, all of these models operate with multiple compressor stages and staged airflow, and incorporate design options similar to efficiency level 1 for the equipment classes with cooling capacities less than 135,000 Btu/h. Therefore, the baseline efficiency was assumed to be the percent improvement in IEER associated with moving from baseline to efficiency level 1 for SPVUs <135,000 Btu/h cooling capacity (*i.e.,* a 9.6 percent increase in IEER). Based on DOE's review of product literature, DOE did not have sufficient information to justify analyzing higher efficiency levels for this equipment class. Therefore, the baseline equipment are also the max-tech.

Table V–10 presents the efficiency levels examined for each SPVU equipment class.

TABLE V–10—INCREMENTAL EFFICIENCY LEVELS

Equipment class	Baseline	Efficiency level 1	Efficiency level 2
Representative Design Options	Single-speed compressor, single-stage indoor/outdoor airflow, ECM indoor blower motor, PSC outdoor fan motor.	Baseline + 2-speed compressor, staged indoor airflow, improved control logic, larger heat exchangers.	Efficiency level 1 + larger indoor and outdoor heat exchangers, higher horsepower (hp) indoor blower/outdoor fan motors.
SPVAC <65,000 Btu/h	12.5 IEER	13.7 IEER	16.1 IEER (Max-Tech).
SPVHP <65,000 Btu/h	12.5 IEER/3.3 COP	13.7 IEER/3.3 COP	16.1 IEER/3.6 COP (Max-Tech).
SPVAC ≥65,000 Btu/h and <135,000 Btu/h	10.3 IEER	11.2 IEER (Max-Tech).	
SPVHP ≥65,000 Btu/h and <135,000 Btu/h	10.3 IEER/3.0 COP	11.2 IEER/3.0 COP (Max-Tech).	
SPVAC ≥135,000 Btu/h and <240,000 Btu/h	11.2 IEER* (Max-Tech).		
SPVHP ≥135,000 Btu/h and <240,000 Btu/h	11.2 IEER/3.0 COP* (Max-Tech).		

*Representative design options for baseline SPVU ≥135,000 Btu/h and <240,000 Btu/h are equivalent to the design options observed at efficiency level 1 for SPVU ≥65,000 Btu/h and <135,000 Btu/h.

Issue–4: DOE requests comment on the proposed incremental higher efficiency levels for each equipment class. DOE requests data showing the range of efficiencies based on IEER and COP available for SPVUs on the market, as well as the design options associated with units at different efficiency levels for each equipment class.

2. Cost Analysis

The cost analysis portion of the engineering analysis is conducted using one or a combination of cost approaches. The selection of cost approach depends on a suite of factors, including the availability and reliability of public information, characteristics of the regulated equipment, and the availability and timeliness of purchasing the equipment on the market. The cost approaches are summarized as follows:

- *Physical teardowns:* Under this approach, DOE physically dismantles commercially-available equipment, component-by-component, to develop a detailed bill of materials for that equipment.
- *Catalog teardowns:* In lieu of physically deconstructing equipment, DOE identifies each component using parts diagrams (*e.g.,* available from manufacturer websites or appliance repair websites) to develop the bill of materials for that equipment.
- *Price surveys:* If neither a physical nor catalog teardown is feasible (*e.g.,* for tightly integrated products such as fluorescent lamps, which are infeasible to disassemble and for which parts diagrams are unavailable) or cost-prohibitive and otherwise impractical (*e.g.,* large commercial boilers), DOE conducts price surveys using publicly-available pricing data published on major online retailer websites and/or by soliciting prices from distributors and other commercial channels.

In the September 2015 final rule, DOE directly analyzed one equipment class (*i.e.,* SPVACs <65,000 Btu/h cooling capacity), then performed a more limited analysis of the other equipment classes based on limited physical/virtual teardowns and scaling the results from the analysis conducted for SPVACs with a cooling capacity less than 65,000 Btu/h. 80 FR 57438, 57459–57460 (Sept. 23, 2015). In the April 2020 RFI, DOE requested comment on whether using this same approach for the current rulemaking is appropriate. DOE also requested comment on the increase in manufacturing production costs (MPCs) associated with each design option and how the costs estimated in the September 2015 final rule have changed. 85 FR 22958, 22965–22966 (April 24, 2020).

In response to this issue raised in the April 2020 RFI, AHRI expressed support for once again directly analyzing the SPVACs <65,000 Btu/h cooling capacity

equipment class and scaling the results to other equipment classes for a future SPVU energy conservation standards rulemaking. (AHRI, No. 9 at p. 8) The commenter suggested extending the cost-efficiency analyses for equipment classes with models to those equipment classes without models on the market, as was done in the previous standards rulemaking. (AHRI, No. 9 at p. 8) AHRI also commented that the costs estimated for each particular design options have not changed significantly since the September 2015 Final Rule analysis. In addition, AHRI cautioned that incorporating backward curve fans would require a total redesign of units and would likely be the last, most expensive improvement that manufacturers would implement. (AHRI, No. 9 at p. 7) As discussed in section V.A.2 of this document, DOE conducted the cost-efficiency analysis consistent with SPVU equipment available on the market. DOE notes that backward curve fans were not necessary to achieve SPVU performance up to the max-tech efficiency level, and as a result, DOE did not consider that technology in its analysis.

In the present case, DOE conducted its cost analysis using physical teardowns on units in its test sample and catalog teardowns to expand the analysis to additional cooling capacities. Similar to the previous rulemaking, DOE conducted physical teardowns with a focus on SPVUs with <65,000 Btu/h cooling capacity. The resulting bill of materials provides the basis for the MPC estimates. As discussed in section V.C.1 of this document, DOE selected a cooling capacity of 36,000 Btu/h as the representative cooling capacity for this equipment class. DOE developed MPC estimates for SPVACs with <65,000 Btu/h cooling capacity based on the physical teardowns of 36,000 Btu/h units at each efficiency level. Where necessary, DOE ensured that the MPC estimates were based on minimally-featured equipment design so that non-efficiency related features (*e.g.,* economizers, dust sensors) are not included in the cost estimates. For SPVHPs, DOE estimated the costs based on the design differences between baseline SPVACs and SPVHPs from the same model line. DOE assumed that this cost difference would be applied to the baseline efficiency level and would remain constant at incremental efficiency levels. For the remaining larger cooling capacity equipment classes, DOE estimated the MPCs based on catalog teardowns and information regarding the design options implemented at each efficiency level scaled from the <65,000 Btu/h cooling capacity equipment class, as discussed in section V.C.1.b of this document.

To account for manufacturers' non-production costs and profit margin, DOE applies a non-production cost multiplier (the manufacturer markup) to the MPC. The resulting manufacturer selling price (MSP) is the price at which the manufacturer distributes a unit into commerce. In the April 2020 RFI, DOE requested comment on whether a manufacturer markup of 1.28, as used in September 2015 final rule, is appropriate for SPVUs. 85 FR 22958, 22966 (April 24, 2020). On this topic, AHRI commented that a manufacturer markup of 1.28 continues to be generally appropriate for SPVUs. (AHRI, No. 9 at p. 8) Accordingly, DOE has retained a manufacturer markup of 1.28 for this analysis.

Because the design options associated with each incremental efficiency level involved increases in cabinet sizes, DOE also estimated the incremental shipping cost at each efficiency level separate from the MSP. More specifically, DOE estimated the per-unit shipping costs based on the outer dimensions (including shipping pallets) at each efficiency level, assuming the use of a typical 53-foot straight-frame trailer with a storage volume of 4,240 cubic feet. DOE notes that SPVAC and SPVHP at the same cooling capacity used the same cabinet design and that the weight differential is typically small between otherwise identical SPVACs and SPVHPs. For shipping of HVAC equipment, the size threshold of a container is typically met before the weight threshold. Accordingly, because SPVACs and SPVHPs use the same cabinet size, DOE estimated the incremental shipping costs for SPVACs and SPVHPs would be equivalent.

3. Cost-Efficiency Results

The results of the engineering analysis are reported as cost-efficiency data (or ''curves'') in the form of IEER (and COP for SPVHPs) versus MSP (in dollars). DOE developed separate cost-efficiency curves for each equipment class. These results are presented in Table V–11 through Table V–14. As discussed in section V.C.1.b of this document, DOE did not analyze any higher efficiency levels for SPVUs ≥135,000 and <240,000 Btu/h cooling capacity, because all units available on the market incorporate the same design features and have the same rated efficiency. As a result, DOE is not presenting any cost-efficiency results for this equipment class. *See* Chapter 5 of the NOPR/NOPD TSD for additional detail on the engineering analysis.

TABLE V–11—COST-EFFICIENCY RESULTS SPVACS <65,000 BTU/H

Efficiency level	Incremental cost ($2021)		
	MPC	MSP	Shipping
Baseline	.....	.....	.....
EL 1	$296.57	$379.61	$42.67
EL 2	1,261.63	1,614.88	57.01

TABLE V–12—COST-EFFICIENCY RESULTS SPVHPS <65,000 BTU/H

Efficiency level	Incremental cost ($2021)		
	MPC	MSP	Shipping
Baseline	.....	.....	.....
EL 1	$296.57	$379.61	$42.67
EL 2	1,261.63	1,614.88	57.01

TABLE V–13—COST-EFFICIENCY RESULTS SPVACS ≥65,000 BTU/H AND <135,000 BTU/H

Efficiency level	Incremental cost ($2021)		
	MPC	MSP	Shipping
Baseline	.....	.....	.....
EL 1	$360.18	$461.03	$161.94

TABLE V–14—COST-EFFICIENCY RESULTS SPVHPS ≥65,000 BTU/H AND <135,000 BTU/H

Efficiency level	Incremental cost ($2021)		
	MPC	MSP	Shipping
Baseline	.....	.....	.....
EL 1	$360.18	$461.03	$161.94

Issue–5: DOE requests comment on the cost-efficiency results. In particular, DOE requests comment on the costs associated with the design options analyzed, as well as the shipping costs associated with each efficiency level.

D. Markups Analysis

The markups analysis develops appropriate markups in the distribution chain (*e.g.,* retailer markups, distributor markups, contractor markups) and sales taxes to convert the MSP estimates for the subject equipment derived in the engineering analysis to consumer prices, which are then used in the LCC and PBP analysis and in the manufacturer impact analysis. At each step in the distribution channel, companies mark up the price of the product to cover business costs and profit margin.

In the September 2015 final rule (and set forth once again here), DOE identified four distribution channels for SPVUs to describe how this equipment passes from the manufacturer to the consumer. 80 FR 57438, 57461 (Sept. 23, 2015).

The first two distribution channels are used in the new construction market:

Manufacturer → HVAC Distributor [20] → Modular Building Manufacturer → Modular Building Distributor → End User

Manufacturer → HVAC Distributor → Modular Building Manufacturer → General Contractor → End User

The other two distribution channels are used in the replacement market:

Manufacturer → HVAC Distributor → Modular Building Distributor → End User

Manufacturer → HVAC Distributor → Mechanical Contractor → End User

In the April 2020 RFI, DOE requested information on the existence of any distribution channels other than the four distribution channels identified in the September 2015 final rule. DOE also requested data on the fraction of SPVU sales that go through each of the four identified distribution channels, as well as the fraction of sales through any other identified channels. DOE also requested comment on its approach to estimating markups and any financial data available that would assist the Department in developing markups for the various segments of the SPVU distribution channels. 85 FR 22958, 22966 (April 24, 2020).

On this topic, AHRI and NEEA commented that there are more SPVU distribution channels than the four identified in the September 2015 final rule, although the four from the previous rule make up the majority of the market. AHRI and NEEA stated that SPVUs are also commonly installed in other non-modular applications such as multi-family housing, residential care, lodging, and other applications, and, therefore, those distribution channels would differ from the four used in the September 2015 final rule. (AHRI, No. 9 at p. 8; NEEA, No. 6 at p. 3) For this reason, AHRI recommended that DOE should add the following three distribution channels for SPVUs. (AHRI, No. 9 at p. 8)

Manufacturer → Sales Representative → HVAC Distributor → End User

Manufacturer → End User (National Account)

Manufacturer → Sales Representative → General Contractor → End User

AHRI did not provide the fraction of overall SPVU sales that travel through each of these new distribution channels.

As discussed in section III.A of this document, DOE updated the definitions pertaining to SPVUs in the November 2022 Test Procedure Final Rule so as to distinguish between commercial SPVUs and consumer central air conditioners. DOE notes that many of the products currently certified as SPVUs that are marketed for multi-family and lodging applications are being misclassified and should be properly classified as central air conditioners. DOE understands that the distribution channels for this equipment would be different than that of SPVUs used in modular buildings, and the Department believes that the distribution channels suggested by AHRI and NEEA fall in this category. To reiterate, central air conditioners that are misclassified as SPVUs are not included in this NOPR/NOPD, so, therefore, DOE did not adopt any of the additional distribution channels suggested by commenters to its analysis for this NOPR.

In summary, for this NOPR/NOPD, DOE considered the four distribution channels shown in Table V–15. The estimated percentages of the total sales in the new construction and replacement markets for each of the four distribution channels is listed in the bottom row of Table V–15.

[20] In the 2015 final rule, the second step in the distribution channel was designated as HVAC Distributor or Manufacturer Representative. Subsequently, DOE has determined that these markups are the same, so this step in the channel is now simply referred to as HVAC Distributor for consistency with the other HVAC product markups.

TABLE V–15—DISTRIBUTION CHANNELS FOR SPVU EQUIPMENT

Channel 1	Channel 2	Channel 3	Channel 4
New construction	New construction	Replacement	Replacement
Manufacturer	Manufacturer	Manufacturer	Manufacturer.
HVAC Distributor	HVAC Distributor	HVAC Distributor	HVAC Distributor.
Modular Building Manufacturer	Modular Building Manufacturer	Modular Building Distributor	Mechanical Contractor.
Modular Building Distributor	General Contractor		
Consumer	Consumer	Consumer	Consumer.
12.5%	12.5%	37.5%	37.5%.

Once these distribution channels were developed, DOE developed baseline and incremental markups for each actor in the distribution chain. Baseline markups are applied to the price of equipment with baseline efficiency, while incremental markups are applied to the difference in price between baseline and higher-efficiency models (the incremental cost increase). The incremental markup is typically less than the baseline markup and is designed to maintain similar per-unit operating profit before and after new or amended standards.[21]

DOE updated the sources used in the September 2015 final rule to derive markups for each step of the distribution channel with the following sources: (1) the 2017 Annual Wholesale Trade Survey [22] to develop HVAC and Modular Building wholesaler markups; (2) the Air Conditioning Contractors of America's (ACCA) ''2005 Financial Analysis for the HVACR Contracting Industry'' [23] and 2017 U.S. Census Bureau economic data [24] to develop mechanical contractor markups; (3) 2017 U.S. Census Bureau economic data for the commercial and institutional building construction industry to develop general contractor markups; [25] and (4) the U.S. Census Bureau's Annual Survey of Manufacturers.[26] The overall markup is the product of all the markups (baseline or incremental markups) for the different steps within a distribution channel. Replacement channels include sales taxes, which were calculated based on State sales tax data reported by the Sales Tax Clearinghouse.[27]

Chapter 6 of the NOPR/NOPD TSD provides details on DOE's development of markups for SPVUs.

E. Energy Use Analysis

The purpose of the energy use analysis is to determine the annual energy consumption of SPVUs at different efficiencies in representative commercial buildings, and to assess the energy savings potential of increased SPVU efficiency. The energy use analysis estimates the range of energy use of SPVUs (unit energy consumption (UEC)) in the field (*i.e.,* as they are actually used by commercial consumers). The energy use analysis provides the basis for other analyses DOE performed, particularly assessments of the energy savings and the savings in consumer operating costs that could result from adoption of amended or new standards.

In the September 2015 final rule, DOE analyzed the energy consumption of SPVUs using a whole building energy simulation approach for three types of commercial buildings: modular offices, modular schools, and telecommunication structures. The annual energy use was simulated using Energy Plus.[28] 80 FR 57438, 57462 (Sept. 23, 2015). For this analysis, DOE developed three prototypical building models to simulate modular offices, modular schools, and telecommunications structures. For offices and schools, a 1,568 ft^2 wood-frame structure was developed with performance characteristics (lighting density, ventilation, envelope, economizer usage) meeting the requirements of ASHRAE Standard 90.1–2004. Schedules and load profiles were taken from the DOE commercial reference buildings [29] for primary schools and small offices. For telecommunications shelters, a 240 ft^2 precast concrete structure was developed. These shelters were assumed to operate with a constant thermal load of 6.86 kW (23,400 Btu/h) in all hours of the year, thus requiring year round cooling. 80 FR 57438, 57462 (Sept. 23, 2015).

In the April 2020 RFI, DOE recounted the analytical process to determine energy use taken for the September 2015 SPVU final rule and requested comment on using that approach in the current rulemaking, as well as input on any necessary modifications to such approach.

On that topic, AHRI suggested that after the draft AHRI Standard 390 is adopted, DOE should conduct a simulation approach that aligns more with an IEER analysis, rather than following the analysis for the September 2015 final rule (based on the EER metric). AHRI supported DOE's assumption that telecom cooling loads are constant throughout the year, and the commenter agreed that the telecom cooling loads used in the September 2015 final rule were reasonable. Regarding economizer usage in telecommunications structures, AHRI commented that economizers were assumed to be present in 50 percent of the SPVU market in the IEER analysis, but the organization pointed out that ASHRAE Standard 90.1 and California

[21] Because the projected price of standards-compliant equipment is typically higher than the price of baseline equipment, using the same markup for the incremental cost and the baseline cost would result in higher per-unit operating profit. While such an outcome is possible, DOE maintains that in markets that are reasonably competitive, it is unlikely that standards would lead to a sustainable increase in profitability in the long run.

[22] U.S. Census Bureau, *2017 Annual Wholesale Trade Report, NAICS 4236: Household Appliances and Electrical and Electronic Goods Merchant Wholesalers* (2017) (Available at: *www.census.gov/wholesale/index.html*) (Last accessed June 9, 2022).

[23] ''2005 Financial Analysis for the HVACR Contracting Industry,'' Air Conditioning Contractors of America (2005) (Last accessed June 9, 2022).

[24] ''Plumbing, Heating, and Air-Conditioning Contractors. Sector 23: 238220. Construction: Industry Series, Preliminary Detailed Statistics for Establishments, 2017,'' U.S. Census Bureau (2017) (Available at: *https://www.census.gov/data/tables/2017/econ/economic-census/naics-sector-23.html*) (Last accessed June 9, 2022).

[25] ''2017 Economic Census, Construction Industry Series and Wholesale Trade Subject Series,'' U.S. Census Bureau (Available at: *https://www.census.gov/data/tables/2017/econ/economic-census/naics-sector-23.html*) (Last accessed June 9, 2022).

[26] U.S. Census Bureau's Annual Survey of Manufacturers (Available at: *https://www.census.gov/programs-surveys/asm/data.html*) (Last accessed: June 9, 2022).

[27] Sales Tax Clearinghouse (Available at: *https://thestc.com/*) (Last accessed June 9, 2022).

[28] EnergyPlus is a whole building simulation program used to model cooling and heating loads. (Available at: *https://energyplus.net/*) (Last accessed August 15, 2022).

[29] For more information, please refer to the DOE Commercial Reference Buildings web pages for small offices (*https://www.energy.gov/eere/downloads/reference-buildings-building-type-small-office*) and primary schools (*https://www.energy.gov/eere/downloads/reference-buildings-building-type-primary-school*).

title 24 have existing and proposed economizer requirements, some by climate zone. (AHRI, No. 9 at pp. 8–9)

In response, DOE notes that it used the same building prototypes and loads that were used to establish the IEER metric when developing the annual unit energy consumption of SPVUs in this NOPR. Regarding economizers, DOE notes that the ASHRAE economizer requirements apply to systems with cooling capacities >54,000 Btu/h.[30] The representative capacity for SPVUs <65,000 Btu/h in this NOPR/NOPD is 36,000 Btu/h, and units at this capacity make up over 95 percent of SPVU shipments; therefore, DOE did not make changes to the cooling loads (the same as those used to develop AHRI 390), as it would have had little to no impact on average unit energy consumption of SPVUs. California title 24 imposes economizer requirements on covered equipment, and the 2022 amendments to that law reduce the cooling capacity of the equipment subject to those provisions to 33,000 Btu/h.[31] DOE notes that the cooling operating hours in southern California would be reduced by this new building code, leading to lower UECs. Given the already very negative LCC savings, DOE did not make adjustments to the cooling operating hours for southern California, as a reduction in the UEC would only reduce LCC savings further, and accordingly, it would not be likely to change DOE's tentative decision to proceed with a determination that more-stringent energy conservation standards for SPVUs are not warranted at this time.

NEEA commented that DOE should update its energy use analysis to include the deployment of SPVUs in other types of commercial buildings beyond modular buildings. In support of its recommendation, NEEA cites the 2019 Commercial Building Stock Assessment,[32] a regional dataset of commercial buildings in the Pacific Northwest, which shows that SPVUs are used in residential care facilities, lodging facilities, and one warehouse. (NEEA, No. 6 at p. 3) Similarly, AHRI also suggested that DOE should add multi-family and lodging buildings in the energy use analysis. (AHRI, No. 9 at p. 8)

As discussed in section III.A of this document, DOE updated the definitions of SPVUs in the November 2022 Test Procedure Final Rule to distinguish between commercial SPVUs and consumer central air conditioners. DOE notes that many of the products currently certified as SPVUs that are marketed for non-modular applications are being misclassified and should be classified as central air conditioners. Therefore, DOE did not add any further building types to the energy use analysis for SPVUs.

In the 2015 final rule, DOE used hourly energy use simulations to model the energy use of SPVUs in modular offices, modular schools, and telecommunications structures.[33] The IEER metric was developed by the AHRI–390 committee using the load profiles from DOE's 2015 final rule simulations in 15 cities, each representing an International Energy Conservation Code (IECC) climate zone. For telecommunications structures, the SPVUs were modeled both with and without economizers. As discussed previously, the IEER metric captures the cooling efficiency of SPVUs at four load conditions: A—100% load; B—75% load; C—50% load, and D—25% load. DOE calculated the percentage of full load by dividing the hourly cooling load by the design day cooling capacity of the SPVU by building type and climate zone. DOE then binned the hours into one of the four IEER load conditions based on the percentage of design day load as shown in Table V–16.

TABLE V–16—IEER LOAD BINS

IEER load condition	Percentage of design day
A—100%	97% to 100%.
B—75%	62.5% to 97%.
C—50%	37.5% to 62.5%.
D—25%	0 to 37.5%.

Cooling UECs were calculated by multiplying the hours in each bin by the estimated power and then summing the electricity use of the four bins for each building type, in each climate zone. The baseline Heating UECs for SPVHPs were taken from the September 2015 final rule, and from that baseline, heating UECs for higher efficiency levels were scaled by the change in COP.

DOE used county-level population data from the U.S. Census Bureau,[34] along with a Pacific Northwest Laboratory report,[35] that assigned a climate zone to each county in the U.S. to develop population weighting factors for each climate zone. Next, DOE used the county-level population data and climate zones to determine the weighted-average UEC for each Census Division, with Census Division 9 split into two regions: (1) California and (2) the remaining States of Census Division 9 (Washington, Oregon, Hawaii, and Alaska). The resulting UECs represent the average SPVU cooling and heating energy use, by building type and Census Division.

Chapter 7 of the NOPR/NOPD TSD provides details on DOE's energy use analysis for SPVUs.

F. Life-Cycle Cost and Payback Period Analysis

DOE conducted LCC and PBP analyses to evaluate the economic impacts on individual consumers of potential energy conservation standards for SPVUs. The effect of new or amended energy conservation standards on individual consumers usually involves a reduction in operating cost and an increase in purchase cost. DOE used the following two metrics to measure consumer impacts:

- The LCC is the total consumer expense of an appliance or product over the life of that product, consisting of total installed cost (manufacturer selling price, distribution chain markups, sales tax, and installation costs) plus operating costs (expenses for energy, maintenance, and repair). To compute the operating costs, DOE discounts future operating costs to the time of purchase (*i.e.,* the anticipated year of compliance with new or amended standards) and sums them over the lifetime of the product.
- The PBP is the estimated amount of time (in years) it takes consumers to recover the increased purchase cost (including installation) of a more-efficient product through lower operating costs. DOE calculates the PBP by dividing the change in purchase cost at higher efficiency levels by the change in annual operating cost for the year that amended or new standards are assumed to take effect.

For any given efficiency level, DOE measures the change in LCC relative to the LCC in the no-new-standards case, which reflects the estimated efficiency distribution of SPVUs in the absence of new or amended energy conservation standards. In contrast, the PBP for a given efficiency level is measured relative to the baseline product.

[30] ANSI/ASHRAE Standard 90.1–2019, p 99.

[31] *See https://title24stakeholders.com/measures/cycle-2022/hvac-controls/.*

[32] Available at: *https://neea.org/data/commercial-building-stock-assessments.*

[33] For more detail on the hourly energy use simulations, please refer to chapter 7 of the 2015 final rule TSD (Available at: *https://www.regulations.gov/document/EERE-2012-BT-STD-0041-0027*).

[34] Available at: *www.census.gov/data/datasets/time-series/demo/popest/2010s-counties-total.html#par_textimage_70769902* (Last accessed April 1, 2022).

[35] Available at: *www.energy.gov/sites/prod/files/2015/10/f27/ba_climate_region_guide_7.3.pdf.*

For each considered efficiency level in each SPVU equipment class, DOE calculated the LCC and PBP in modular schools, modular offices, and telecom structures and then combined to develop aggregate results. As stated previously, DOE developed a sample of SPVU users by Census Division based on simulation data that was used to develop the IEER metric. For each Census Division, DOE determined the average energy consumption for an SPVU in a modular school, modular office, and telecom structure and the appropriate electricity price. By developing a sample of UECs by building type and Census Division, the analysis captured the variability in energy consumption and energy prices associated with the use of SPVUs.

Inputs to the calculation of total installed cost include the cost of the equipment—which includes MPCs, manufacturer markups, distributor markups, contractor markups, and sales taxes—and installation costs. Inputs to the calculation of operating expenses include annual energy consumption, energy prices and price projections, repair and maintenance costs, equipment lifetimes, discount rates, and the anticipated year that compliance with new or amended standards is required. DOE created distributions of values for equipment lifetime, discount rates, and sales taxes, with probabilities attached to each value, to account for their uncertainty and variability.

The computer model DOE uses to calculate the LCC and PBP relies on a Monte Carlo simulation to incorporate uncertainty and variability into the analysis. The Monte Carlo simulations randomly sample input values from the probability distributions and SPVU user samples. The model calculated the LCC and PBP for equipment at each efficiency level for 10,000 scenarios per simulation run. The analytical results include a distribution of 10,000 data points showing the range of LCC savings for a given efficiency level relative to the no-new-standards case efficiency distribution. In performing an iteration of the Monte Carlo simulation for a given consumer, equipment efficiency is chosen based on its probability. If the chosen equipment efficiency is greater than or equal to the efficiency of the standard level under consideration, the LCC and PBP calculation reveals that an SPVU owner is not impacted by that standard level. By accounting for SPVU owners who already purchase more-efficient equipment, DOE avoids overstating the potential benefits from increasing equipment efficiency.

DOE calculated the LCC and PBP for all consumers of SPVUs as if each were to purchase a new SPVU in the expected year of required compliance with amended standards. Amended standards would apply to SPVUs manufactured on and after the date that is one year after the date of publication of any new or amended standard in the **Federal Register**. (See section VI.B.4 of this document for discussion of DOE's calculation of lead time for this rulemaking.) At this time, DOE estimates publication of a final rule for amended SPVU energy conservation standards in 2024. Therefore, for purposes of its analysis, DOE used 2025 as the first year of compliance with any amended standards for SPVUs.

Table V–17 summarizes the approach and data DOE used to derive inputs to the LCC and PBP calculations. The subsections that follow provide further related discussion. Details of the spreadsheet model, as well as all the inputs to the LCC and PBP analyses, are contained in chapter 8 of the NOPR/NOPD TSD.

TABLE V–17—SUMMARY OF INPUTS AND METHODS FOR THE LCC AND PBP ANALYSIS*

Inputs	Source/method
Equipment Cost	Derived by multiplying MPCs by manufacturer, contractor, and distributor markups and sales tax, as appropriate. A constant price trend was used to project equipment costs.
Installation Costs	Typical installation costs are generally not expected to vary by efficiency level; therefore, DOE did not include installation costs in the LCC analysis. However, replacement installations at EL 2 for SPVUs <65,000 Btu/h require a conversion curb, so this cost was included at EL 2 for replacement installations.
Annual Energy Use	The binned hours in each IEER load bin are multiplied by the power consumption at each of the four IEER load conditions. Variability: Census Division and Building Type
Energy Prices	Electricity: Based on Edison Electric Institute data of average and marginal prices. Variability: Regional energy prices by census division, with census division 9 separated into California and the rest of the census division.
Energy Price Trends	Based on *AEO 2022* price projections.
Repair and Maintenance Costs	Maintenance costs do not change by efficiency level. Annualized repair costs determined using RS Means in the 2015 final rule, costs updated to 2021 dollars using GDP deflator. The materials portion of annualized repair costs scale with the increase in MPC.
Product Lifetime	Average: 15 years
Discount Rates	Commercial discount rates for schools, industrial, offices and utilities (telecom). The approach involves estimating the cost of capital of companies that purchase SPVU equipment.
Compliance Date	2025

* References for the data sources mentioned in this table are provided in the sections following the table or in chapter 8 of the NOPR/NOPD TSD.

1. Equipment Cost

To calculate consumer equipment costs, DOE multiplied the MPCs developed in the engineering analysis by the markups described previously (along with sales taxes). DOE used different markups for baseline equipment and higher-efficiency equipment, because DOE applies an incremental markup to the increase in MSP associated with higher-efficiency equipment.

In the September 2015 final rule, DOE explained its rationale for using a constant price trend to project the equipment prices in the compliance year. 80 FR 57438, 57466 (Sept. 23, 2015). DOE maintained this approach for this NOPR/NOPD and used a constant trend for equipment prices between 2021 (the year for which MPCs were developed) and 2025 (the anticipated compliance year of amended standards). The constant trend is based on a historical time series of the inflation-adjusted (deflated) Producer Price Index (PPI) for all other miscellaneous refrigeration and air conditioning equipment between 1990

and 2021.[36] The deflated PPI does not indicate a long term upward or downward trend, and, therefore, DOE maintained a constant price trend for SPVUs.

For more information on equipment costs, please refer to chapter 8 of the NOPR/NOPD TSD.

2. Installation Cost

Installation cost includes labor, overhead, and any miscellaneous materials and parts needed to install the equipment. DOE determined that the labor required for typical installation would not change by EL, and, therefore, DOE did not include typical installation costs in this analysis. However, DOE notes that replacement installation at EL 2 would require a conversion curb, so, therefore, an installation cost is included for replacement installation at EL 2 for SPVUs <65,000 Btu/h.

For more information on installation costs, please refer to chapter 8 of the NOPR/NOPD TSD.

3. Annual Energy Consumption

For each Census Division and building type, DOE determined the annual energy consumption of an SPVU at different efficiency levels using the approach described previously in section V.E of this document.

For more information on annual energy consumption, please refer to chapter 7 of the NOPR/NOPD TSD.

4. Energy Prices

Because marginal electricity price reflects the cost to a consumer of a kilowatt-hour at the highest level of consumption, it provides a better representation than average electricity prices of the value of saving electricity via more efficient equipment. Therefore, DOE applied average electricity prices for the energy use of the equipment purchased in the no-new-standards case, and marginal electricity prices for the incremental change in energy use associated with the other efficiency levels considered.

DOE derived electricity prices in 2021 using data from Edison Electric Institute (EEI) Typical Bills and Average Rates reports.[37] Based upon comprehensive, industry-wide surveys, this semi-annual report presents typical monthly electric bills and average kilowatt-hour costs to the customer as charged by investor-owned utilities. With these data, DOE calculated commercial-sector electricity prices using the methodology described in Coughlin and Beraki (2019).[38]

DOE's methodology allows electricity prices to vary by sector and region. For a given product, electricity prices are chosen to be consistent with the way the consumer economic and energy use characteristics are defined in the LCC analysis. To measure the baseline energy cost for SPVUs, DOE used the average annual electricity prices for large commercial customers for modular schools and offices, and DOE used average annual electricity prices for small commercial customers for telecommunications structures. Marginal annual electricity prices for large commercial and small commercial customers were used to measure the operating cost savings from higher-efficiency SPVUs. See chapter 8 of the NOPR/NOPD TSD for details.

To estimate energy prices in future years, DOE multiplied the 2021 energy prices by the projection of annual average price changes for each of the nine Census Divisions from the Reference Case in *AEO 2022,* which has an end year of 2050.[39] Because extended long-term price trends are more uncertain, DOE kept the energy price constant at the 2050 level for the years after 2050.

5. Maintenance and Repair Costs

Repair costs are associated with repairing or replacing equipment components that have failed in an appliance; maintenance costs are associated with maintaining the proper operation of the equipment. In the September 2015 final rule, because data were not available to indicate how maintenance costs vary with equipment efficiency, DOE assumed maintenance costs are constant across each EL by equipment class. For repairs, DOE developed an annualized repair cost estimate, using repair cost data from RS Means,[40] assuming that a repair takes place in year 10 and that the equipment lifetime is 15 years. DOE scaled the materials portion of repair costs with the increase in the average retail price to project repair costs of higher-efficiency SPVUs. 80 FR 57438, 57466–57467 (Sept. 23, 2015). DOE used average annualized repair costs of $173.50 for SPVUs <65,000 Btu/h and $212 for SPVUs >65,000 and < 135,000 Btu/h in the 2015 final rule.[41] DOE requested comment on SPVU maintenance and repair costs in the April 2020 RFI. 85 FR 22958, 22967 (April 24, 2020).

On this topic, AHRI confirmed that maintenance costs are not likely to differ between baseline and higher-efficiency products, but the commenter stated that the cost for replacement parts will be higher for higher-efficiency products. AHRI did not have any information on failure rates and said that the repair/replace decision is usually based on installation location (*e.g.,* SPVUs in telecommunications structures are more likely to be replaced, whereas SPVUs in school systems are more likely to be repaired). (AHRI, No. 9 at p. 9)

As mentioned previously, because maintenance costs do not vary by EL, DOE did not consider maintenance costs in this analysis. DOE updated the annual repair cost in the September 2015 final rule to 2021 dollars using the GDP implicit price deflator[42] and scaled the materials portion of repair costs by the increase in MPC for higher ELs in this NOPR/NOPD. The annualized repair cost was applied to all SPVUs as an annual operating cost in the LCC and PBP analysis.

For more information on repair and maintenance costs, please refer to chapter 8 of the NOPR/NOPD TSD.

6. Product Lifetime

In the September 2015 final rule, DOE used a distribution with a minimum lifetime of 10 years and a maximum of 25 years, which yielded an average SPVU life of 15 years. (DOE based these distribution estimates on a review of a range of packaged cooling equipment lifetime estimates found in published studies and online documents, because the data did not distinguish between classes of SPVU equipment.) 80 FR 57438, 57467 (Sept. 23, 2015). DOE requested comment on this approach in the April 2020 RFI. 85 FR 22958, 22968 (April 24, 2020).

In response, AHRI commented that the lifetime estimate from the September 2015 final rule is reasonable,

[36] Available at: *https://www.bls.gov/ppi/* (Last accessed March 25, 2022).

[37] Available at: *https://netforum.eei.org/eweb/DynamicPage.aspx?WebCode=COEPubSearch&pager=12* (Last accessed April 14, 2022).

[38] Coughlin, K. and B. Beraki (2019) Non-residential Electricity Prices: A Review of Data Sources and Estimation Methods. Lawrence Berkeley National Lab. Berkeley, CA. Report No. LBNL–2001203 (Available at: *ees.lbl.gov/publications/non-residential-electricity-prices*) (Last accessed Jan. 6, 2020).

[39] EIA, *Annual Energy Outlook 2022 with Projections to 2050* (Available at: *www.eia.gov/forecasts/aeo/*) (Last accessed May 9, 2022).

[40] RS Means CostWorks 2014, R.S. Means Company, Inc. (2013) (Available at: *www.meanscostworks.com/*) (Last accessed Feb. 27, 2014).

[41] Technical Support Document: Energy Efficiency Program for Commercial and Industrial Equipment: Single Package Vertical Units, chapter 8 (Available at: *https://www.regulations.gov/document/EERE-2012-BT-STD-0041-0027*).

[42] Available at: *https://fred.stlouisfed.org/series/GDPDEF* (Last accessed May 9, 2022). A price deflator of 114.2 was used to adjust the previous costs (in 2014$) to 2021$.

and the commenter stated that it does not expect SPVU lifetime to vary by equipment class, efficiency, or end use. (AHRI, No. 9 at p. 9)

In this NOPR/NOPD, DOE used assumed that 14.6 percent of SPVUs would retire per year between years 11 and 15 and afterwards 2.7 percent of SPVUs would retire through year 25.

For more information on equipment lifetime, please refer to chapter 8 of the NOPR/NOPD TSD.

7. Discount Rates

DOE's method for deriving discount rates for commercial entities views the purchase of a higher-efficiency appliance as an investment that yields a stream of energy cost savings. DOE derived the discount rates for the LCC analysis by estimating the cost of capital for companies or public entities that purchase SPVUs. For private firms, the weighted-average cost of capital (WACC) is commonly used to estimate the present value of cash flows to be derived from a typical company project or investment. Most companies use both debt and equity capital to fund investments, so their cost of capital is the weighted average of the cost to the firm of equity and debt financing, as estimated from financial data for publicly-traded firms in the sectors that purchase SPVUs.[43] As discount rates can differ across industries, DOE estimates separate discount rate distributions for a number of aggregate sectors with which elements of the LCC building sample can be associated.

In this analysis, DOE estimated the cost of capital of companies that purchase SPVU equipment. DOE used the discount rates for healthcare and industrial sectors for the modular offices, education sector discount rates for modular schools, and the utility sector discount rates for telecommunications shelters.

For more information on discount rates, please refer to chapter 8 of the NOPR/NOPD TSD.

8. Energy Efficiency Distribution in the No-New-Standards Case

To accurately estimate the share of consumers that would be affected by a potential energy conservation standard at a particular efficiency level, DOE's LCC analysis considers the projected distribution (market shares) of equipment efficiencies under the no-new-standards case (*i.e.,* the case without amended or new energy conservation standards).

In the present case, DOE estimated the current energy efficiency distribution of SPVUs <65,000 Btu/h in terms of IEER, with 62 percent at the baseline, 27 percent at EL 1, and 11 percent at EL 2. For SPVUs >65,000 and <135,000 Btu/h, DOE estimates that 53 percent of the market is at the baseline and that 47 percent is at EL 1. The estimated market shares for the no-new-standards case for SPVUs are shown in chapter 8 of the NOPR/NOPD TSD.

9. Payback Period Analysis

The payback period is the amount of time (expressed in years) it takes the consumer to recover the additional installed cost of more-efficient equipment, compared to baseline equipment, through operating cost savings. Payback periods that exceed the life of the equipment mean that the increased total installed cost is not recovered in reduced operating expenses.

The PBP calculation for each efficiency level considers the change in total installed cost of the equipment and the change in the first-year annual operating expenditures relative to the baseline equipment. DOE refers to this as a ''simple PBP'' because it does not consider changes over time in operating cost savings. The PBP calculation uses the same inputs as the LCC analysis, except that energy price trends, repair costs, and discount rates are not used.

For more information on PBP, please refer to chapter 8 of the NOPR/NOPD TSD.

VI. Analytical Results and Conclusions

The following section addresses the results from DOE's analyses with respect to the considered energy conservation standards for SPVUs. Additional details regarding DOE's analyses are contained in the NOPR/NOPD TSD supporting this document.

A. Economic Impacts on SPVU Consumers

DOE analyzed the economic impacts of potential amended standards at more-stringent levels on SPVU consumers by calculating the LCC savings and the PBP at each considered EL. Inputs used for calculating the LCC and PBP include total installed costs (*i.e.,* equipment price plus installation costs) and operating costs (calculated using annual energy use, energy prices, energy price trends, repair costs, and maintenance costs). The LCC calculation also uses product lifetime and a discount rate. Chapter 8 of the NOPR/NOPD TSD provides detailed information on the LCC and PBP analyses.

Table VI–1 through Table VI–4 show the LCC and PBP results for the ELs considered in this analysis. There are no results for SPVUs >= 135,000 Btu/h and < 240,000 Btu/h because there are no efficiency levels above the baseline. Note that the simple payback is measured relative to the baseline product. The LCC savings are measured relative to the efficiency distribution in the no-new-standards case in the compliance year (see section V.F.8 of this document). The LCC savings refer only to consumers who are affected by a standard at a given EL. Those who already purchase a product with efficiency at or above a given EL are not affected. Consumers for whom the LCC increases (negative LCC savings) at a given EL experience a net cost.

TABLE VI–1—AVERAGE LCC AND PBP RESULTS BY EFFICIENCY LEVEL FOR SPVACS <65,000 BTU/H

Efficiency level	LCC savings (2021$)	Simple payback period (years)
EL 1	−246	12.3
EL 2	−2,179	21.6

TABLE VI–2—AVERAGE LCC AND PBP RESULTS BY EFFICIENCY LEVEL FOR SPVHPS <65,000 BTU/H

Efficiency level	LCC savings (2021$)	Simple payback period (years)
EL 1	−608	30.1

[43] Modigliani, F. and M. H. Miller, The Cost of Capital, Corporations Finance and the Theory of Investment, American Economic Review (1958) 48(3): pp. 261–297.

TABLE VI–2—AVERAGE LCC AND PBP RESULTS BY EFFICIENCY LEVEL FOR SPVHPS <65,000 BTU/H—Continued

Efficiency level	LCC savings (2021$)	Simple payback period (years)
EL 2	−1,939	17.8

TABLE VI–3—AVERAGE LCC AND PBP RESULTS BY EFFICIENCY LEVEL FOR SPVACS ≥65,000 BTU/H AND <135,000 BTU/H

Efficiency level	LCC savings (2021$)	Simple payback period (years)
EL 1	92	8.3

TABLE VI–4—AVERAGE LCC AND PBP RESULTS BY EFFICIENCY LEVEL FOR SPVHPS ≥65,000 BTU/H AND <135,000 BTU/H

Efficiency level	LCC savings (2021$)	Simple payback period (years)
EL 1	−703	20.7

B. Proposed Determination

EPCA specifies that for any commercial and industrial equipment addressed under 42 U.S.C. 6313(a)(6)(A)(i), which includes SPVUs, DOE may prescribe an energy conservation standard more stringent than the level for such equipment in ASHRAE Standard 90.1 only if ''clear and convincing evidence'' shows that a more-stringent standard would result in significant additional conservation of energy and is technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(C)(i); 42 U.S.C. 6313(a)(6)(A)(ii)(II)) The ''clear and convincing'' evidentiary threshold applies both when DOE is triggered by ASHRAE action and when DOE conducts a six-year-lookback rulemaking, with the latter being the basis for the current proceeding. In light of these statutory criteria, DOE conducted an assessment of whether the current energy conservation standards for SPVUs should be replaced with more-stringent standards. DOE's tentative conclusions are set forth in the paragraphs that follow.

1. Technological Feasibility

DOE considers technologies incorporated in commercially-available products or in working prototypes to be technologically feasible. Per the technology options discussed in section V.A.2 of this document, DOE has tentatively determined, based on clear and convincing evidence, that more-stringent energy conservation standards for SPVUs would be technologically feasible.

2. Economic Justification

In determining whether a potential energy conservation standard is economically justified, the Secretary must determine whether the benefits of the standard exceed its burdens by considering, to the greatest extent practicable, the seven statutory factors discussed in section II.A of this document. (42 U.S.C. 6313(a)(6)(A)(ii)(II); 42 U.S.C. 6313(a)(6)(B)(ii)(I)–(VII))

One of those seven factors is the savings in operating costs throughout the estimated average life of the product in the type (or class) compared to any increase in the price, initial charges, or maintenance expenses of the products that are likely to result from the standard. (42 U.S.C. 6313(a)(6)(B)(ii)(II)) This factor is typically assessed using the LCC and PBP analysis.

DOE conducted an LCC analysis to estimate the net costs and benefits to users from increased efficiency in the considered SPVUs. The LCC savings are negative at nearly all ELs considered in this analysis (see Table VI–1 through Table VI–4). The one EL with positive LCC savings is EL 1 for SPVACs ≥65,000 Btu/h and <135,000 Btu/h, which represents less than 3 percent of total SPVU shipments. Given the highly negative results for all other product classes, which make up over 97 percent of SPVU shipments, the LCC savings across all SPVUs product classes would be negative on a weighted average basis. Based on these findings, DOE has tentatively determined that the economic impact of more-stringent standards on the consumers of the equipment subject to the standard, which is one the seven factors used to evaluate economic justification, would be strongly negative.

Because of the importance DOE places on the economic impact of potential standards on consumers, DOE did not explicitly analyze the other factors that it typically considers in determining economic justification, including the projected quantity of energy savings likely to result directly from amended standards.

3. Significant Additional Energy Savings

DOE has tentatively determined that quantification of energy savings from potential amended standards is not necessary if there is strong evidence that such standards would not be economically justified.

4. Summary

DOE may prescribe an energy conservation standard more stringent than the level for such equipment in ASHRAE Standard 90.1 only if ''clear and convincing evidence'' shows that a more-stringent standard would result in significant additional conservation of energy and is technologically feasible and economically justified. Based on the negative LCC savings at all but one EL for each equipment class, and weighted average negative LCC savings across all SPVUs, DOE has tentatively determined that it lacks ''clear and convincing'' evidence that more-stringent standards would be economically justified for SPVUs. Therefore, DOE is proposing to determine that more-stringent energy conservation standards for SPVUs are not warranted. DOE will consider and respond to all comments received on this proposed determination when issuing any final determination or

supplemental notice of proposed rulemaking (SNOPR).

As a separate matter, DOE is proposing to amend the energy conservation standards for SPVUs so as to be based on the IEER and COP metrics that are of equivalent stringency as the current Federal standard levels (and equivalent to the current standard levels specified in ASHRAE Standard 90.1–2019). The proposed standards are presented in Table VI–5. These proposed standards, if adopted, would apply to all SPVUs manufactured in, or imported into, the United States starting on the compliance date, as discussed in the following paragraphs.

TABLE VI–5—PROPOSED ENERGY CONSERVATION STANDARDS FOR SPVUS

Equipment class	Proposed standard level
SPVAC <65,000 Btu/h	IEER = 12.5
SPVHP <65,000 Btu/h	IEER = 12.5 COP = 3.3
SPVAC ≥65,000 Btu/h and <135,000 Btu/h.	IEER = 10.3
SPVHP ≥65,000 Btu/h and <135,000 Btu/h.	IEER = 10.3 COP = 3.0
SPVAC ≥135,000 Btu/h and <240,000 Btu/h.	IEER = 11.2
SPVHP ≥135,000 Btu/h and <240,000 Btu/h.	IEER = 11.2 COP = 3.0

In instances in which DOE adopts more-stringent standards under its 6-year-lookback review authority, EPCA states that any such standard shall apply to equipment manufactured after a date that is the latter of the date three years after publication of the final rule establishing such standard or six years after the effective date for the current standard. (42 U.S.C. 6313(a)(6)(C)(iv)) As discussed, DOE has tentatively determined that it does not have clear and convincing evidence to justify adopting more-stringent standards for SPVUs, so, therefore, the three-year and/or six-year lead time period would not apply.

Instead, the proposed energy conservation standards for SPVUs are of equivalent stringency but based on a new metric (*i.e.,* IEER), and as discussed in section III.C of this document, DOE amended the SPVU test procedure to include provisions for measuring IEER in the November 2022 Test Procedure Final Rule. As required by EPCA, beginning 360 days following the final test procedure rule, all representations of energy efficiency and energy use must be made in accordance with that amended test procedure. (42 U.S.C. 6314(d)(1)) In this case, DOE is proposing to apply a one-year lead time, similar to that provided for the test procedure update addressing IEER, such that the compliance date for the proposed amended energy conservation standards for SPVUs would be 360 days after the publication in the **Federal Register** of the final rule for amended energy conservation standards based on the IEER metric, if adopted.

VII. Procedural Issues and Regulatory Review

A. Review Under Executive Orders 12866 and 13563

Executive Order (E.O.) 12866, ''Regulatory Planning and Review,'' 58 FR 51735 (Oct. 4, 1993), as supplemented and reaffirmed by E.O. 13563, ''Improving Regulation and Regulatory Review,'' 76 FR 3821 (Jan. 21, 2011), requires agencies, to the extent permitted by law, to: (1) propose or adopt a regulation only upon a reasoned determination that its benefits justify its costs (recognizing that some benefits and costs are difficult to quantify); (2) tailor regulations to impose the least burden on society, consistent with obtaining regulatory objectives, taking into account, among other things, and to the extent practicable, the costs of cumulative regulations; (3) select, in choosing among alternative regulatory approaches, those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity); (4) to the extent feasible, specify performance objectives, rather than specifying the behavior or manner of compliance that regulated entities must adopt; and (5) identify and assess available alternatives to direct regulation, including providing economic incentives to encourage the desired behavior, such as user fees or marketable permits, or providing information upon which choices can be made by the public. DOE emphasizes as well that E.O. 13563 requires agencies to use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible. In its guidance, the Office of Information and Regulatory Affairs (OIRA) in the Office of Management and Budget (OMB) has emphasized that such techniques may include identifying changing future compliance costs that might result from technological innovation or anticipated behavioral changes. For the reasons stated in the preamble, this proposed regulatory action is consistent with these principles.

Section 6(a) of E.O. 12866 also requires agencies to submit ''significant regulatory actions'' to OIRA for review. OIRA has determined that this proposed regulatory action does not constitute a ''significant regulatory action'' under section 3(f) of E.O. 12866. Accordingly, this action was not submitted to OIRA for review under E.O. 12866.

B. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires preparation of an initial regulatory flexibility analysis (IRFA) for any rule where the agency was first required by law to publish a proposed rule for public comment, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. As required by Executive Order 13272, ''Proper Consideration of Small Entities in Agency Rulemaking,'' 67 FR 53461 (August 16, 2002), DOE published procedures and policies on February 19, 2003 to ensure that the potential impacts of its rules on small entities are properly considered during the DOE rulemaking process. 68 FR 7990. DOE has made its procedures and policies available on the Office of the General Counsel's website: *energy.gov/gc/office-general-counsel.*

DOE reviewed this document under the provisions of the Regulatory Flexibility Act and the policies and procedures published on February 19, 2003. DOE has tentatively concluded that this proposed rule/proposed determination will not have a significant impact on a substantial number of small entities. The factual basis for this determination is as follows:

For manufacturers of SPVU equipment, the Small Business Administration (SBA) considers a business entity to be a ''small business'' if, together with its affiliates, it employs less than a threshold number of workers specified in 13 CFR part 121. SPVU manufacturers, who produce the equipment covered by this document, are classified under NAICS code 333415, ''Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing.'' In 13 CFR 121.201, the SBA sets a threshold of 1,250 employees or fewer for an entity to be considered as a small business for this category. This employee threshold includes all employees in a business's parent company and any other subsidiaries.

DOE identified manufacturers using DOE's Compliance Certification

Database (CCD),[44] manufacturer interviews, the California Energy Commission's Modernized Appliance Efficiency Database System (MAEDbS),[45] and information from prior DOE rulemakings. Additionally, DOE used publicly-available information and subscription-based market research tools (*e.g.,* reports from Dun & Bradstreet) [46] to determine headcount, revenue, and geographic presence of the small businesses. DOE has initially identified a total of five companies that manufacture SPVUs in the United States. DOE screened out companies that do not meet the definition of ''small business'' or are foreign-owned and operated. Of these five companies, DOE identified one as a domestic small business.

In this document, DOE proposes to adopt energy conservation standards for SPVUs based on the Integrated Energy Efficiency Ratio (IEER) metric for SPVACs and SPVHPs, and the Coefficient of Performance (COP) metric for SPVHPs. In the November 2022 Test Procedure Final Rule, DOE amended the test procedures for SPVUs to incorporate by reference AHRI 390–2021, which added a seasonal metric that includes part-load cooling performance—the IEER metric. DOE has determined that the IEER metric is more representative of the cooling efficiency for SPVUs on an annual basis than the current EER market. DOE conducted a crosswalk analysis to develop IEER levels that are of equivalent stringency to the current EER standard levels. DOE has tentatively determined that it lacks clear and convincing evidence to support adoption of amended standards for SPVUs (in terms of IEER and COP) that are more stringent than the current standards for SPVUs, because the Department has tentatively concluded that such standards would not be economically justified.

Therefore, DOE determined that manufacturers would only incur costs as result of this NOPR/NOPD if a manufacturer were not already testing to AHRI 390–2021.[47] However, in the November 2022 Test Procedure Final Rule, DOE determined that it would be unlikely for manufacturers to incur testing costs given that most SPVU manufacturers are AHRI members, and that DOE is referencing the prevailing industry test procedure that was established for use in AHRI's certification program. Furthermore, DOE notes that the sole identified small business that manufacturers SPVUs is an AHRI member.

As discussed in the 2022 Test Procedure Final Rule, DOE determined that the test procedure impacts to manufacturers would not have a significant economic impact on a substantial number of small businesses. Therefore, on the basis of limited small entities affected and the *de minimis* compliance burden, DOE certifies that this proposed rule would not have a ''significant economic impact on a substantial number of small entities,'' and that the preparation of a IRFA is not warranted. DOE will transmit a certification and supporting statement of factual basis to the Chief Counsel for Advocacy of the Small Business Administration for review under 5 U.S.C. 605(b).

Issue–6: DOE requests comment on its assessment of impacts on domestic, small manufacturers of SPVUs. Specifically, DOE requests comment on its understanding that this proposed rule/proposed determination will not have a significant economic impact on a substantial number of small businesses.

C. Review Under the Paperwork Reduction Act of 1995

DOE's regulations pertaining to certification and compliance activities ensure accurate and comprehensive information about the energy and water use characteristics of covered products and covered equipment sold in the United States. (*See generally* 10 CFR part 429.) Manufacturers of all covered products and covered equipment, including SPVUs, must submit a certification report before a basic model is distributed in commerce, annually thereafter, and if the basic model is redesigned in such a manner to increase the consumption or decrease the efficiency of the basic model such that the certified rating is no longer supported by the test data. Additionally, manufacturers must report when production of a basic model has ceased and is no longer offered for sale as part of the next annual certification report following such cessation. DOE requires the manufacturer of any covered product or covered equipment to establish, maintain, and retain the records of certification reports, of the underlying test data for all certification testing, and of any other testing conducted to satisfy the requirements of part 429, part 430, and/or part 431. Certification reports provide DOE and consumers with comprehensive, up-to date efficiency information and support effective enforcement.

The collection-of-information requirement for certification and recordkeeping is subject to review and approval by OMB under the Paperwork Reduction Act (PRA). OMB Control Number 1910–1400, Compliance Statement Energy/Water Conservation Standards for Appliances, is currently valid and assigned to the certification reporting requirements applicable to covered equipment, including SPVUs. Public reporting burden for the certification is estimated to average 35 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Revised certification data would be required for SPVU were this NOPR/NOPD to be finalized as proposed; however, DOE is not proposing amended certification or reporting requirements for SPVUs in this NOPR. Instead, DOE may consider proposals to establish certification requirements and reporting for SPVUs under a separate rulemaking regarding appliance and equipment certification. DOE will address changes to OMB Control Number 1910–1400 at that time, as necessary.

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the PRA, unless that collection of information displays a currently valid OMB Control Number.

D. Review Under the National Environmental Policy Act of 1969

In this NOPR/NOPD, DOE is proposing amended energy conservation standards for SPVUs that would utilize a new cooling efficiency metric (IEER); however, the amended standards, if adopted, would be of equivalent stringency to the current Federal standards for SPVUs. DOE is analyzing this proposed regulation in accordance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.;* ''NEPA'') and DOE's NEPA implementing regulations at 10 CFR part 1021. DOE's regulations include a categorical exclusion for rulemakings that establish energy conservation standards for consumer products or industrial equipment. 10 CFR part 1021,

[44] DOE's Compliance Certification Database is available at: *www.regulations.doe.gov/ccms* (Last accessed May 2, 2022).

[45] California Energy Commission's MAEDbS is available at: *cacertappliances.energy.ca.gov/Pages/ApplianceSearch.aspx* (Last accessed May 2, 2022).

[46] Dun & Bradstreet reports are available at: *app.dnbhoovers.com* (Last access May 2, 2022).

[47] DOE estimated the cost for this small business to re-rate all models to be $30,200 while making use of an alternative efficiency determination method (AEDM). DOE determined this cost to represent less than 1 percent of annual revenue for the small, domestic manufacturer of SPVUs.

subpart D, appendix B5.1. DOE anticipates that this rulemaking qualifies for categorical exclusion B5.1 because it is a rulemaking that establishes energy conservation standards for consumer products or industrial equipment, none of the exceptions identified in categorical exclusion B5.1(b) apply, no extraordinary circumstances exist that require further environmental analysis, and it otherwise meets the requirements for application of a categorical exclusion. *See* 10 CFR 1021.410. DOE will complete its NEPA review before issuing the final rule.

E. Review Under Executive Order 13132

E.O. 13132, ''Federalism,'' 64 FR 43255 (August 10, 1999), imposes certain requirements on Federal agencies formulating and implementing policies or regulations that preempt State law or that have federalism implications. The Executive order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and to carefully assess the necessity for such actions. The Executive order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. 65 FR 13735. DOE has examined this proposed rule/proposed determination and has tentatively determined that it would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. EPCA governs and prescribes Federal preemption of State regulations as to energy conservation for the equipment that are the subject of this proposed rule/proposed determination. States can petition DOE for exemption from such preemption to the extent, and based on criteria, set forth in EPCA. (42 U.S.C. 6316(a) and (b); 42 U.S.C. 6297(d)) Therefore, no further action is required by Executive Order 13132.

F. Review Under Executive Order 12988

With respect to the review of existing regulations and the promulgation of new regulations, section 3(a) of E.O. 12988, ''Civil Justice Reform,'' 61 FR 4729 (Feb. 7, 1996), imposes on Federal agencies the general duty to adhere to the following requirements: (1) eliminate drafting errors and ambiguity; (2) write regulations to minimize litigation; (3) provide a clear legal standard for affected conduct rather than a general standard, and (4) promote simplification and burden reduction. Regarding the review required by section 3(a), section 3(b) of E.O. 12988 specifically requires that executive agencies make every reasonable effort to ensure that the regulation: (1) clearly specifies the preemptive effect, if any; (2) clearly specifies any effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction; (4) specifies the retroactive effect, if any; (5) adequately defines key terms, and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires executive agencies to review regulations in light of applicable standards in section 3(a) and section 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, this proposed rule/proposed determination meets the relevant standards of E.O. 12988.

G. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. Public Law 104–4, section 201 (codified at 2 U.S.C. 1531). For a proposed regulatory action likely to result in a rule that may cause the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector of $100 million or more in any one year (adjusted annually for inflation), section 202 of UMRA requires a Federal agency to publish a written statement that estimates the resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a), (b)) The UMRA also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and Tribal governments on a proposed ''significant intergovernmental mandate,'' and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect them. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under UMRA. 62 FR 12820. DOE's policy statement is also available at *energy.gov/sites/prod/files/gcprod/documents/umra_97.pdf.*

DOE examined this proposed rule/proposed determination according to UMRA and its statement of policy and determined that it contains neither a Federal intergovernmental mandate, nor a mandate expected to require expenditures of $100 million or more in any one year. As a result, the analytical requirements of UMRA do not apply.

H. Review Under the Treasury and General Government Appropriations Act, 1999

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Pub. L. 105–277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. This proposed rule would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

I. Review Under Executive Order 12630

Pursuant to E.O. 12630, ''Governmental Actions and Interference with Constitutionally Protected Property Rights,'' 53 FR 8859 (March 18, 1988), DOE has determined that this proposed rule/proposed determination would not result in any takings that might require compensation under the Fifth Amendment to the U.S. Constitution.

J. Review Under the Treasury and General Government Appropriations Act, 2001

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516 note) provides for Federal agencies to review most disseminations of information to the public under information quality guidelines established by each agency pursuant to general guidelines issued by OMB. OMB's guidelines were published at 67 FR 8452 (Feb. 22, 2002), and DOE's guidelines were published at 67 FR 62446 (Oct. 7, 2002). Pursuant to OMB Memorandum M–19–15, Improving Implementation of the Information Quality Act (April 24, 2019), DOE published updated guidelines which are available at: *www.energy.gov/sites/prod/files/2019/12/f70/DOE%20Final%20Updated%20IQA%20Guidelines%20Dec%202019.pdf.* DOE has reviewed this proposed rule/proposed determination under the OMB and DOE guidelines and has concluded

that it is consistent with applicable policies in those guidelines.

K. Review Under Executive Order 13211

E.O. 13211, ''Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use,'' 66 FR 28355 (May 22, 2001), requires Federal agencies to prepare and submit to OIRA at OMB, a Statement of Energy Effects for any proposed significant energy action. A ''significant energy action'' is defined as any action by an agency that promulgates or is expected to lead to promulgation of a final rule, and that: (1) is a significant regulatory action under Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy, or (3) is designated by the Administrator of OIRA as a significant energy action. For any proposed significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use should the proposal be implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use.

DOE has tentatively concluded that this regulatory action, which does not propose to increase stringency beyond the current Federal standard levels for SPVUs, is not a significant energy action because it is not a significant regulatory action under E.O. 12866. Moreover, it would not have a significant adverse effect on the supply, distribution, or use of energy, nor has it been designated as such by the Administrator at OIRA. Accordingly, DOE has not prepared a Statement of Energy Effects.

L. Review Under the Information Quality Bulletin for Peer Review

On December 16, 2004, OMB, in consultation with the Office of Science and Technology Policy (OSTP), issued its Final Information Quality Bulletin for Peer Review (the Bulletin). 70 FR 2664 (Jan. 14, 2005). The Bulletin establishes that certain scientific information shall be peer reviewed by qualified specialists before it is disseminated by the Federal Government, including influential scientific information related to agency regulatory actions. The purpose of the bulletin is to enhance the quality and credibility of the Government's scientific information. Under the Bulletin, the energy conservation standards rulemaking analyses are ''influential scientific information,'' which the Bulletin defines as ''scientific information the agency reasonably can determine will have, or does have, a clear and substantial impact on important public policies or private sector decisions.'' 70 FR 2664, 2667.

In response to OMB's Bulletin, DOE conducted formal peer reviews of the energy conservation standards development process and the analyses that are typically used and has prepared a report describing that peer review.[48] Generation of this report involved a rigorous, formal, and documented evaluation using objective criteria and qualified and independent reviewers to make a judgment as to the technical/scientific/business merit, the actual or anticipated results, and the productivity and management effectiveness of programs and/or projects. Because available data, models, and technological understanding have changed since 2007, DOE has engaged with the National Academy of Sciences to review DOE's analytical methodologies to ascertain whether modifications are needed to improve the Department's analyses. DOE is in the process of evaluating the resulting report.[49]

VIII. Public Participation

A. Participation in the Public Meeting Webinar

The time and date of the webinar meeting are listed in the **DATES** section at the beginning of this document. Webinar registration information, participant instructions, and information about the capabilities available to webinar participants will be published on DOE's website: *www.energy.gov/eere/buildings/public-meetings-and-comment-deadlines* Participants are responsible for ensuring their systems are compatible with the webinar software.

B. Procedure for Submitting Prepared General Statements for Distribution

Any person who has an interest in the topics addressed in this NOPR/NOPD, or who is representative of a group or class of persons that has an interest in these issues, may request an opportunity to make an oral presentation at the public meeting webinar. Such persons may submit requests to speak via email to the Appliance and Equipment Standards Program at: *ApplianceStandardsQuestions@ee.doe.gov.* Persons who wish to speak should include with their request a computer file in WordPerfect, Microsoft Word, PDF, or text (ASCII) file format that briefly describes the nature of their interest in this rulemaking and the topics they wish to discuss. Such persons should also provide a daytime telephone number where they can be reached.

DOE requests persons selected to make an oral presentation to submit an advance copy of their statements at least two weeks before the webinar. At its discretion, DOE may permit persons who cannot supply an advance copy of their statement to participate, if those persons have made advance alternative arrangements with the Building Technologies Office. As necessary, requests to give an oral presentation should ask for such alternative arrangements.

C. Conduct of the Public Meeting Webinar

DOE will designate a DOE official to preside at the public meeting webinar and may also use a professional facilitator to aid discussion. The meeting will not be a judicial or evidentiary-type public hearing, but DOE will conduct it in accordance with section 336 of EPCA (42 U.S.C. 6306). A court reporter will be present to record the proceedings and prepare a transcript. DOE reserves the right to schedule the order of presentations and to establish the procedures governing the conduct of the public meeting webinar. There shall not be discussion of proprietary information, costs or prices, market share, or other commercial matters regulated by U.S. anti-trust laws. After the public meeting webinar and until the end of the comment period, interested parties may submit further comments on the proceedings and any aspect of the rulemaking.

The webinar will be conducted in an informal, conference style. DOE will present a general overview of the topics addressed in this rulemaking, allow time for prepared general statements by participants, and encourage all interested parties to share their views on issues affecting this rulemaking. Each participant will be allowed to make a general statement (within time limits determined by DOE), before the discussion of specific topics. DOE will allow, as time permits, other participants to comment briefly on any general statements.

At the end of all prepared statements on a topic, DOE will permit participants to clarify their statements briefly and comment on statements made by others.

[48] The 2007 ''Energy Conservation Standards Rulemaking Peer Review Report'' is available at the following website: *energy.gov/eere/buildings/downloads/energy-conservation-standards-rulemaking-peer-review-report-0.*

[49] The report is available at *www.nationalacademies.org/our-work/review-of-methods-for-setting-building-and-equipment-performance-standards* (Last accessed August 5, 2022).

Participants should be prepared to answer questions by DOE and by other participants concerning these issues. DOE representatives may also ask questions of participants concerning other matters relevant to this rulemaking. The official conducting the webinar will accept additional comments or questions from those attending, as time permits. The presiding official will announce any further procedural rules or modification of the procedures that may be needed for the proper conduct of the public meeting webinar.

A transcript of the public meeting webinar will be included in the docket, which can be viewed as described in the *Docket* section at the beginning of this document. In addition, any person may buy a copy of the transcript from the transcribing reporter.

D. Submission of Comments

DOE will accept comments, data, and information regarding this proposed rule/proposed determination before or after the public meeting, but no later than the date provided in the **DATES** section at the beginning of this document. Interested parties may submit comments, data, and other information using any of the methods described in the **ADDRESSES** section at the beginning of this document.

Submitting comments via www.regulations.gov. The *www.regulations.gov* web page will require 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 itself 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. Otherwise, persons viewing comments will see only first and last names, organization names, correspondence containing comments, and any documents submitted with the comments.

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

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

Submitting comments via email, hand delivery/courier, or postal mail. Comments and documents submitted via email, hand delivery/courier, or postal mail also will be posted to *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. With this instruction followed, the cover letter will not be publicly viewable as long as it does not include any comments.

Include contact information each time you submit comments, data, documents, and other information to DOE. If you submit via postal mail or hand delivery/courier, please provide all items on a CD, if feasible, in which case it is not necessary to submit printed copies. No telefacsimiles (faxes) will be accepted.

Comments, data, and other information submitted to DOE electronically should be provided in PDF (preferred), Microsoft Word or Excel, WordPerfect, or text (ASCII) file format. Provide documents that are not secured, that are written in English, and that are 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).

E. Issues on Which DOE Seeks Comment

Although DOE welcomes comments on any aspect of this proposal, DOE is particularly interested in receiving comments and views of interested parties concerning the following issues:

Issue–1: DOE requests comment on the proposed baseline IEER levels for SPVUs, as well as comment on any aspect of its crosswalk analysis. DOE continues to seek information which compares EER to IEER for the SPVUs that are representative of the market baseline efficiency level for all equipment classes.

Issue–2: DOE requests comment on the proposed technology options for SPVUs. DOE also requests data on the potential improvement in IEER and COP associated with these technology options.

Issue–3: DOE requests comment on the proposed baseline efficiency levels and the design options associated with these levels.

Issue–4: DOE requests comment on the proposed incremental higher efficiency levels for each equipment class. DOE requests data showing the range of efficiencies based on IEER and COP available for SPVUs on the market, as well as the design options associated with units at different efficiency levels for each equipment class.

Issue–5: DOE requests comment on the cost-efficiency results. In particular, DOE requests comment on the costs associated with the design options analyzed, as well as the shipping costs associated with each efficiency level.

Issue–6: DOE requests comment on its assessment of impacts on domestic, small manufacturers of SPVUs.

Specifically, DOE requests comment on its understanding that this proposed rule/proposed determination will not have a significant economic impact on a substantial number of small businesses.

Additionally, DOE welcomes comments on other issues relevant to the conduct of this proposed rulemaking that may not specifically be identified in this document.

IX. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this notice of proposed rulemaking; notification of proposed determination.

List of Subjects in 10 CFR Part 431

Administrative practice and procedure, Confidential business information, Energy conservation, Household appliances, Imports, Intergovernmental relations, Laboratories, Reporting and recordkeeping requirements, Small businesses.

Signing Authority

This document of the Department of Energy was signed on November 22, 2022, by Francisco Alejandro Moreno, 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 Monday November 23, 2022.

Treena V. Garrett,

Federal Register Liaison Officer, U.S. Department of Energy.

For the reasons set forth in the preamble, DOE proposes to amend part 431 of Chapter II, Subchapter D, of Title 10 of the Code of Federal Regulations, as set forth below:

PART 431—ENERGY EFFICIENCY CONSERVATION PROGRAM FOR CERTAIN COMMERCIAL AND INDUSTRIAL EQUIPMENT

■ 1. The authority citation for part 431 continues to read as follows:

Authority: 42 U.S.C 6291–6317; 28 U.S.C 2461 note.

■ 2. Section 431.97 is amended by revising paragraph (d) to read as follows:

§ 431.97 Energy efficiency standards and their compliance dates.

* * * * *

(d) (1) Each single package vertical air conditioner and single package vertical heat pump manufactured on and after October 9, 2015 (for models ≥65,000 Btu/h and <135,000 Btu/h) or October 9, 2016 (for models ≥135,000 Btu/h and <240,000 Btu/h), or September 23, 2019 (for models <65,000 Btu/h), but before (*compliance date of final rule*) must meet the applicable minimum energy conservation standard level(s) set forth in Table 9 of this section.

TABLE 9 TO § 431.97—MINIMUM EFFICIENCY STANDARDS FOR SINGLE PACKAGE VERTICAL AIR CONDITIONERS AND SINGLE PACKAGE VERTICAL HEAT PUMPS

Equipment type	Cooling capacity	Sub-category	Efficiency level	Compliance date: products manufactured on and after . . .
Single package vertical air conditioners and single package vertical heat pumps, single-phase and three-phase.	<65,000 Btu/h	AC	EER = 11.0	September 23, 2019.
		HP	EER = 11.0 COP = 3.3	September 23, 2019.
Single package vertical air conditioners and single package vertical heat pumps.	≥65,000 Btu/h and <135,000 Btu/h	AC	EER = 10.0	October 9, 2015.
		HP	EER = 10.0 COP = 3.0	October 9, 2015.
Single package vertical air conditioners and single package vertical heat pumps.	≥135,000 Btu/h and <240,000 Btu/h	AC	EER = 10.0	October 9, 2016.
		HP	EER = 10.0 COP = 3.0	October 9, 2016.

(2) Each single package vertical air conditioner and single package vertical heat pump manufactured on or after (*compliance date of final rule*) must meet the applicable minimum energy efficiency standard level(s) set forth in Table 10 of this section.

TABLE 10 TO § 431.97—MINIMUM EFFICIENCY STANDARDS FOR SINGLE PACKAGE VERTICAL AIR CONDITIONERS AND SINGLE PACKAGE VERTICAL HEAT PUMPS

Equipment type	Cooling capacity	Sub-category	Efficiency level	Compliance date: products manufactured on and after . . .
Single package vertical air conditioners and single package vertical heat pumps, single-phase and three-phase.	<65,000 Btu/h	AC	IEER = 12.5	(*compliance date of final rule*).
		HP	IEER = 12.5 COP = 3.3	
Single package vertical air conditioners and single package vertical heat pumps.	≥65,000 Btu/h and <135,000 Btu/h	AC	IEER = 10.3	(*compliance date of final rule*).
		HP	IEER = 10.3 COP = 3.0	
Single package vertical air conditioners and single package vertical heat pumps.	≥135,000 Btu/h and <240,000 Btu/h	AC	IEER = 11.2	(*compliance date of final rule*).
		HP	IEER = 11.2 COP = 3.0	

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