[6450-01-P]

DEPARTMENT OF ENERGY

10 CFR Part 431

EERE-2019-BT-STD-0035

RIN 1904-AE66

Energy Conservation Program: Energy Conservation Standards for Packaged Terminal Air Conditioners and Packaged Terminal Heat Pumps

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

ACTION: Final determination.

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 Packaged Terminal Air Conditioners ("PTACs") and Packaged Terminal Heat Pumps ("PTHPs"). EPCA also requires the U.S. Department of Energy ("DOE") to periodically review standards. In this final determination, DOE has determined that it lacks clear and convincing evidence that more-stringent standards for PTACs and PTHPs would be economically justified. As such, DOE has determined that energy conservation standards for PTACs and PHTPs do not need to be amended.

DATES: The effective date of this determination is [**INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER**].

ADDRESSES: The docket for this rulemaking, which includes *Federal Register* notices, webinar attendee lists and transcripts, 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 information that is exempt from public disclosure.

The docket web page can be found at *www.regulations.gov/docket/EERE-2019-BT-STD-0035*. The docket web page contains instructions on how to access all documents, including public comments, in the docket.

For further information on how to review the docket, contact the Appliance and Equipment Standards Program staff at (202) 287-1445 or by email: *ApplianceStandardsQuestions@ee.doe.gov*.

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I. Synopsis of the Final Determination

The Energy Policy and Conservation Act, Pub. L. 94-163, as amended ("EPCA"),[1] authorizes DOE to regulate the energy efficiency of a number of consumer products and certain industrial equipment. (42 U.S.C. 6291–6317) Title III, Part C[2] of EPCA,[3] established the Energy Conservation Program for Certain Industrial Equipment. (42 U.S.C. 6311-6317) Such equipment includes PTACs and PTHPs, the subject of this rulemaking.

For this determination, DOE analyzed PTACs and PTHPs subject to standards specified in Code of Federal Regulations ("CFR") at 10 CFR 431.97. DOE first analyzed the technological feasibility of more energy efficient PTACs and PTHPs. For those PTACs and PTHPs for which DOE determined higher standards to be technologically feasible, DOE estimated energy savings that would result from potential energy conservation standards by conducting a national impacts analysis ("NIA"). DOE also considered whether potential energy conservation standards would be economically justified. As discussed in the following sections, DOE has determined that it lacks clear and convincing evidence that amended energy conservation standards for PTACs and

[1] All references to EPCA in this document refer to the statute as amended through the Energy Act of 2020, Pub. L. 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] All references to EPCA in this document refer to the statute as amended through the Energy Act of 2020, Pub. L. 116-260 (Dec. 27, 2020), which reflect the last statutory amendments that impact Parts A and A-1 of EPCA.

PTHPs would be economically justified. DOE evaluated whether higher standards would be cost effective by conducting life-cycle cost ("LCC") and payback period ("PBP") analyses and estimated the net present value ("NPV") of the total costs and benefits experienced by consumers.

Based on the results of the analyses, summarized in section V of this document, DOE has determined that it lacks clear and convincing evidence that more stringent standards would result in significant additional energy savings and be technologically feasible and economically justified.

II. Introduction

The following section briefly discusses the statutory authority underlying this final determination, as well as some of the historical background relevant to the establishment of standards for PTACs and PTHPs.

A. Authority

EPCA authorizes DOE to regulate the energy efficiency of a number of consumer products and certain industrial equipment. Title III, Part C of EPCA (42 U.S.C. 6311-6317, as codified), added by Pub. L. 95-619, Title IV, section 441(a), established the Energy Conservation Program for Certain Industrial Equipment, which sets forth a variety of provisions designed to improve energy efficiency. This equipment includes PTACs and PTHPs, the subject of this document. (42 U.S.C. 6311(1)(I)) EPCA prescribed initial standards for this equipment. (42 U.S.C. 6313(a)(3))

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(b); 42 U.S.C. 6297(a)) DOE may, however, grant waivers of Federal preemption in limited instances for particular State laws or regulations, in accordance with the procedures and other provisions set forth under EPCA. (*See* 42 U.S.C. 6316(b)(2)(D))

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), test procedures (42 U.S.C. 6314), labeling provisions (42 U.S.C. 6315), energy conservation standards (42 U.S.C. 6313), and the authority to require information and reports from manufacturers (42 U.S.C. 6316; 42 U.S.C. 6296(a), (b), and (d)).

Subject to certain criteria and conditions, DOE is required to develop test procedures to measure the energy efficiency, energy use, or estimated annual operating cost of covered equipment. (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 PTACs and PTHPs appear at 10 CFR 431.96(g).

The American Society of Heating, Refrigerating, and Air-Conditioning Engineers ("ASHRAE") Standard 90.1 ("ASHRAE Standard 90.1"), "Energy Standard for Buildings Except Low-Rise Residential Buildings," 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 "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 PTACs and PTHPs 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 ("NOPR") including new proposed standards based on certain criteria and procedures in subparagraph (B). (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 the products subject to the standard;

(2) 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 likely to result from the standard;

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

(4) Any lessening of the utility or the performance of the products 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 considers relevant.

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

EPCA, as codified, 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))

EPCA further provides that, not later than three years after the issuance of a final determination not to amend standards, DOE must publish either a notice of determination that standards for the product do not need to be amended, or a NOPR including new proposed energy conservation standards (proceeding to a final rule, as appropriate). (42 U.S.C. 6313(a)(6)(C)(iii)(II)) A determination that amended energy conservation standards are not needed must be based on the same considerations as if it were adopting a standard that is more stringent than an amendment to ASHRAE Standard 90.1. (42 U.S.C. 6313(a)(6)(C)(i)(II); 42 U.S.C. 6313(a)(6)(A)) DOE must make the analysis on which the determination is based publicly available and provide an opportunity for written comment. (42 U.S.C. 6313(a)(6)(C)(ii))

DOE is publishing this final determination in satisfaction of the 6-year review requirement in EPCA, having determined that DOE lacks clear and convincing evidence that amended standards for PTACs and PTHPs would be economically justified.

B. Background

1. Current Standards

In a final rule published on July 21, 2015 ("July 2015 final rule"), DOE prescribed the current energy conservation standards for PTACs and PTHPs. 80 FR 43162. These levels are expressed in energy efficiency ratio ("EER") for the cooling mode for PTACs and PTHPs and in coefficient of performance ("COP") for the heating mode for PTHPs. 10 CFR 431.97(c). EER is defined as the ratio of the produced cooling effect of an air conditioner or heat pump to its net work input, expressed in British thermal units ("Btu")/watt-hour. 10 CFR 431.92. COP is defined as the ratio of the produced cooling effect of an air conditioner or heat pump (or its produced heating effect, depending on the mode of operation) to its net work input, when both the cooling (or heating) effect and the net work input are expressed in identical units of measurement. 10 CFR 431.92.

The current energy conservation standards are located at 10 CFR 431.97, Table 7 and Table 8 and repeated in Table II-1.

Table II.1. Federal Energy Conservation Standards for PTACs and PTHPs

Equipment Class			Efficiency Level*	Compliance Date: products manufactured on or after
Equipment Type	**Category**	**Cooling Capacity (British thermal units per hour ("Btu/h")**		
PTAC	Standard Size**	<7,000 Btu/h	EER = 11.9	January 1, 2017
		≥7,000 Btu/h and ≤15,000 Btu/h	EER = 14.0 – (0.300 x Cap††)	January 1, 2017
		>15,000 Btu/h	EER = 9.5	January 1, 2017
	Non-Standard Size†	<7,000 Btu/h	EER = 9.4	October 7, 2010
		≥7,000 Btu/h and ≤15,000 Btu/h	EER = 10.9 – (0.213 x Cap††)	October 7, 2010
		>15,000 Btu/h	EER = 7.7	October 7, 2010
PTHP	Standard Size**	<7,000 Btu/h	EER = 11.9 COP = 3.3	October 8, 2012
		≥7,000 Btu/h and ≤15,000 Btu/h	EER = 14.0 – (0.300 x Cap††) COP = 3.7 – (0.052 x Cap††)	October 8, 2012
		>15,000 Btu/h	EER = 9.5 COP = 2.9	October 8, 2012
	Non-Standard Size†	<7,000 Btu/h	EER = 9.3 COP = 2.7	October 7, 2010
		≥7,000 Btu/h and ≤15,000 Btu/h	EER = 10.8 – (0.213 x Cap††) COP = 2.9 – (0.026 x Cap††)	October 7, 2010
		>15,000 Btu/h	EER = 7.6 COP = 2.5	October 7, 2010

* For equipment rated according to the DOE test procedure prescribed at 10 CFR 431.96(g).
** Standard size means a PTAC or PTHP with wall sleeve dimensions having an external wall opening of greater than or equal to 16 inches high or greater than or equal to 42 inches wide, and a cross-sectional area greater than or equal to 670 square inches. 10 CFR 431.92.
† Non-standard size means a PTAC or PTHP with existing wall sleeve dimensions having an external wall opening of less than 16 inches high or less than 42 inches wide, and a cross-sectional area less than 670 square inches. *Id.*
†† Cap means cooling capacity in thousand Btu/h at 95°F outdoor dry-bulb temperature.

2. History of Standards Rulemakings for PTACs and PTHPs

In the July 2015 final rule, DOE published amendments to the PTAC and PTHP standards in response to the 2013 update to ASHRAE Standard 90.1 ("ASHRAE Standard 90.1–2013"). 80 FR 43162. DOE determined that ASHRAE Standard 90.1–2013 amended the standards for three of the 12 PTAC and PTHP equipment classes: PTAC standard size less than 7,000 Btu/h, PTAC standard size greater than or equal 7,000 Btu/h and less than or equal to 15,000 Btu/h, and PTAC standard size greater than 15,000 Btu/h. 80 FR 43162, 43163. DOE adopted the standard levels for these three equipment classes as updated by ASHRAE Standard 90.1-2013, with compliance with the amended standards required for equipment manufactured on or after January 1, 2017. *Id*. DOE did not amend the energy conservation standards for the remaining nine equipment classes, which were already aligned with the standards in ASHRAE Standard 90.1–2013. 80 FR 43162, 43166. DOE was unable to show with clear and convincing evidence that energy conservation standards at levels more stringent than the minimum levels specified in the ASHRAE Standard 90.1–2013 for any of the 12 equipment classes would be economically justified. 80 FR 43162, 43163.

Since ASHRAE Standard 90.1-2013 was published, ASHRAE Standard 90.1 has undergone three further revisions. A revision was published on October 26, 2016 ("ASHRAE Standard 90.1-2016") and a revision was published on October 24, 2019 ("ASHRAE Standard 90.1-2019"). The most recent revision was published in January, 2023 ("ASHRAE Standard 90.1-2022"). None of these publications amended the minimum EER and COP levels for PTACs and PTHPs.

In support of the present review of the PTACs and PTHPs energy conservation standards, DOE published an early assessment review request for information ("RFI") on December 21, 2020 ("December 2020 ECS RFI"), which identified various issues on which DOE sought comment to inform its determination of whether the standards need to be amended. 85 FR 82952.

Subsequently, on June 24, 2022, DOE published a notice of proposed determination ("NOPD") where DOE tentatively determined that it lacks clear and convincing evidence that more-stringent standards for PTACs and PTHPs would result in significant additional energy savings and be technologically feasible and economically justified ("June 2022 NOPD"). 87 FR 37934.

DOE received comments in response to the June 2022 NOPD from the interested parties listed in Table II-2. These comments are discussed in detail in section IV of this document.

Table II.2. June 2022 NOPD Written Comments

Commenter(s)	Reference in this NOPD	Commenter No.	Commenter Type
Air-Conditioning, Heating, and Refrigeration Institute	AHRI	21	Trade Association
Northwest Energy Efficiency Alliance, American Council for an Energy-Efficient Economy, Appliance Standards Awareness Project	Joint Advocates	20	Efficiency Organizations
Pacific Gas and Electric Company, San Diego Gas and Electric , and Southern California Edison	CA IOUs	19	Utilities
New York State Energy Research and Development Authority	NYSERDA	18	Efficiency Organizations

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

III. General Discussion

DOE developed this final determination 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. Equipment Classes and Scope of Coverage

When evaluating and establishing energy conservation standards, DOE divides covered equipment into equipment classes by the type of energy used or by capacity or

[4] The parenthetical reference provides a reference for information located in the docket. (Docket No. EERE-2019-BT-STD-0035, which is maintained at *www.regulations.gov).* The references are arranged as follows: (commenter name, comment docket ID number, page of that document).

other performance-related features that justify differing standards. This determination covers PTACs and PTHPs.

PTAC is defined as a wall sleeve and a separate un-encased combination of heating and cooling assemblies specified by the builder and intended for mounting through the wall, and that is industrial equipment. 10 CFR 431.92. It includes a prime source of refrigeration, separable outdoor louvers, forced ventilation, and heating availability by builder's choice of hot water, steam, or electricity. *Id.*

PTHP is defined as a PTAC that utilizes reverse cycle refrigeration as its prime heat source, that has a supplementary heat source available, with the choice of hot water, steam, or electric resistant heat, and that is industrial equipment. *Id.*

The scope of coverage is discussed in further detail in section IV.A.1 of this document. The PTAC and PTHP classes for this determination are discussed in further detail in section IV.A.2 of this document.

B. Test Procedure

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 product complies with energy conservation standards and to quantify the efficiency of their product. (42 U.S.C. 6314(d)). As discussed, DOE's current energy conservation standards for PTACs and PTHPs are expressed in terms of EER and COP. 10 CFR 431.97.

DOE's current test procedures for PTACs and PTHPs were last updated in a test procedure final rule on June 30, 2015 ("June 2015 TP final rule"). 80 FR 37136. The current test procedure for cooling mode incorporates by reference AHRI Standard 310/380-2014, "Standard for Packaged Terminal Air-Conditioners and Heat Pumps" ("AHRI Standard 310/380-2014") with the following sections applicable to the DOE test procedure: sections 3, 4.1, 4.2, 4.3, and 4.4; American National Standards Institute ("ANSI")/ASHRAE 16-1983 (RA 2014), "Method of Testing for Rating Room Air Conditioners and Packaged Terminal Air Conditioners" ("ANSI/ASHRAE Standard 16-1983") and ANSI/ASHRAE 37-2009, "Methods of Testing for Rating Electrically Driven Unitary Air-Conditioning and Heat Pump Equipment" ("ANSI/ASHRAE Standard 37-2009"). 10 CFR 431.96(g)(1). The current test procedure for heating mode testing incorporates by reference AHRI Standard 310/380-2014, with the following sections applicable to the DOE test procedure: sections 3, 4.1, 4.2 (except the section 4.2.1.2(b) reference to ANSI/ASHRAE 37), 4.3, and 4.4; and ANSI/ASHRAE Standard 58-1986 (RA 2014), "Method of Testing for Rating Room Air-Conditioner and Packaged Terminal Air-Conditioner Heating Capacity" ("ANSI/ASHRAE Standard 58-1986"). 10 CFR 431.96(g)(2). The currently applicable DOE test procedures for PTACs and PTHPs appear at 10 CFR 431.96 (g).

The current test procedures also include additional provisions in paragraphs (c) and (e) of 10 CFR 431.96. 10 CFR 431.96(b)(1). Paragraph (c) of 10 CFR 431.96 specifies provisions for an optional compressor break-in period, and paragraph (e) of 10

CFR 431.96 details what information sources can be used for unit set-up and provides specific set-up instructions for refrigerant parameters (*e.g.*, superheat) and air flow rate.[5]

DOE's current test procedure for PTACs and PTHPs do not include a seasonal metric that includes part-load performance. As part of an ongoing test procedure rulemaking, DOE published a RFI on May 25, 2021 ("May 2021 TP RFI"), in which DOE requested information and data to consider amendments to DOE's test procedure for PTACs and PTHPs. 86 FR 28005. Specifically, DOE requested comment on whether it should consider adopting for PTACs and PTHPs a cooling-mode metric and a heating-mode metric that integrates part-load performance to better represent full-season efficiency. 86 FR 28005, 28010-28011. Were DOE to amend the PTAC and PTHP test procedure to incorporate a part-load metric, any analysis for future standards rulemakings would be based on the amended test procedure.

DOE received general comments related to the test procedure in response to the June 2022 NOPD. AHRI recommended that DOE incorporate by reference AHRI Standard 310/280-2017 without modifications as it includes provisions currently prescribed in 10 CFR 431.96, while also including alternative energy determination method (AEDM) requirements, instructions on refrigerant charge, standard rating requirements for non-US and non-Canada climate regions, and ASHRAE 58 as the only permissible standard to use as the heat rating test method. (AHRI, No. 21 at p. 2-3)

[5] The amendatory instructions in the June 2015 TP final rule for PTACs and PTHPs includes the reference to AHRI Standard 310/380-2014 in paragraphs (c) and (e), indicating that the requirements do apply to this equipment, even though the current CFR does not include this reference. 80 FR 37136, 37149 (June 30, 2015).

AHRI noted that the AHRI Standard 310/380 committee recently met to consider the development of test procedures for variable speed operation, low temperature operation, and a test procedure for determining the energy consumption associated with the dehumidification function of make-up air PTACs/PTHPs as part of the revision effort. *Id.* AHRI noted that DOE has a representative on this committee and encouraged DOE's involvement in the review process. *Id.*

NYSERDA asserted that current PTHP standards do not sufficiently address low temperature ambient conditions in equipment classes and test procedures. (NYSERDA No. 18 at p. 1-2) NYSERDA stated the current PTHP heating performance metric does not adequately represent a PTHP's average use cycle during the heating season, and strongly urged the DOE prioritize this element in the next round of test procedure and standards updates. *Id.* NYSERDA highlighted their anticipation for increasing demand for heat pump solutions with decarbonization policies being implemented and requested future test procedures be more representative of New York's climate zones 4A, 5A, and 6A as well as cold climates in general. *Id.*

The CA IOUs asserted that the current PTAC and PTHP test procedures can be significantly improved and commented that they are currently testing PTACs and PTHPs and expect to provide DOE and stakeholders with data on several test procedure topics, including energy consumption at part-load conditions, heating performance at temperatures lower than current standard heating mode rating conditions, and energy consumption associated with the delivery of conditioned make-up air. (CA IOUs, No. 19

at p. 1). The CA IOUs suggested that this data will be helpful when considering test procedure revisions. *Id.*

Joint Advocates commented that an improved test procedure could uncover opportunities for significant cost-effective energy savings and encouraged DOE to update the test procedure to include a part-load cooling metric and a heating metric that includes performance at low ambient temperatures. (Joint Advocates, No. 20 at p. 1)

DOE will consider these comments in the ongoing test procedure rulemaking. Discussion of part-load technologies as they relate to standards is contained in section IV.A.3 of this document.

For the purpose of this final determination, DOE relied on the test procedures for PTACs and PTHPs as currently established at 10 CFR 431.96(g), which does not include part-load metrics.

C. 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 determination. 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. These technology options are discussed in detail in section IV.B.3 of this document. 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; sections 6(b)(3)(i) and 7(b)(1) of appendix A to 10 CFR part 430 subpart C ("Appendix A").

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; sections 6(b)(3)(ii)-(v) and 7(b)(2)-(5) of Appendix A. Section IV.B.4 of this document discusses the results of the screening analysis for PTACs and PTHPs, particularly the designs DOE considered, those it screened out, and those that are the basis for the standards considered in this final determination. For further details on the screening analysis for this final determination, see section IV.B.4 of this document.

2. Maximum Technologically Feasible Levels

When DOE proposes to adopt an amended standard for a type or class of covered equipment more stringent than the level in ASHRAE 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 PTACs and PTHPs, 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 analysis are described in section IV.C.4 of this final determination.

D. Energy Savings

1. Determination of Savings

For each efficiency level ("EL") evaluated, DOE projected energy savings from application of the EL to the PTACs and PTHPs purchased in the 30-year period that begins in the assumed year of compliance with the potential standards (2026–2055). The savings are measured over the entire lifetime of the PTACs and PTHPs purchased in the aforementioned 30-year period. DOE quantified the energy savings attributable to each EL as the difference in energy consumption between each standards case and the no-new-standards case. The no-new-standards case represents a projection of energy consumption that reflects how the market for a product would likely evolve in the absence of amended energy conservation standards.

DOE used its national impacts analysis ("NIA") spreadsheet model to estimate national energy savings ("NES") from potential amended standards for PTACs and PTHPs. The NIA spreadsheet model (described in section V.B of this document) calculates energy savings in terms of site energy, which is the energy directly consumed

by products at the locations where they are used. For electricity, DOE reports NES in terms of primary energy savings, which is the savings in the energy that is used to generate and transmit the site electricity. DOE also calculates NES in terms of full-fuel-cycle ("FFC") energy savings. The FFC metric includes the energy consumed in extracting, processing, and transporting primary fuels (*i.e.*, coal, natural gas, petroleum fuels), and thus presents a more complete picture of the impacts of energy conservation standards.[6] DOE's approach is based on the calculation of an FFC multiplier for each of the energy types used by covered products or equipment. For more information on FFC energy savings, see section IV.H of this document.

2. Significance of Savings

In determining whether amended standards are needed, DOE must consider whether such standards will result in significant conservation of energy[7]. (42 U.S.C. 6313(a)(6)(C)(i)(I)); (42 U.S.C. 6313(a)(6)(A)(ii)(II)). The significance of energy savings offered by a new or amended energy conservation standard cannot be determined without knowledge of the specific circumstances surrounding a given rulemaking.[8] For example, some covered products and equipment have most of their energy consumption occur during periods of peak energy demand. The impacts of these products on the

[6] The FFC metric is discussed in DOE's statement of policy and notice of policy amendment. 76 FR 51282 (Aug. 18, 2011), as amended at 77 FR 49701 (Aug. 17, 2012).

[7] In setting a more stringent standard for ASHRAE equipment, DOE must have "clear and convincing evidence" that doing so "would result in significant additional conservation of energy" in addition to being technologically feasible and economically justified. 42 U.S.C. 6313(a)(6)(A)(ii)(II). This language indicates that Congress had intended for DOE to ensure that, in addition to the savings from the ASHRAE standards, DOE's standards would yield additional energy savings that are significant. In DOE's view, this statutory provision shares the requirement with the statutory provision applicable to covered products and non-ASHRAE equipment that "significant conservation of energy" must be present (42 U.S.C. 6295(o)(3)(B)) —and supported with "clear and convincing evidence"—to permit DOE to set a more stringent requirement than ASHRAE.

[8] *See* 86 FR 70892, 70901 (Dec. 13, 2021).

energy infrastructure can be more pronounced than products with relatively constant demand. Accordingly, DOE evaluates the significance of energy savings on a case-by-case basis, taking into account the significance of cumulative FFC national energy savings, the cumulative FFC emissions reductions, and the need to confront the global climate crisis, among other factors.

E. Economic Justification

As noted previously, EPCA provides seven factors to be evaluated in determining whether a potential 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 final determination.

1. Economic Impact on Manufacturers and Consumers

In determining the impacts of a potential amended standard on manufacturers, DOE conducts a manufacturing impact analysis ("MIA"). DOE first uses an annual cash-flow approach to determine the quantitative impacts. This step includes both a short-term assessment—based on the cost and capital requirements during the period between when a regulation is issued and when entities must comply with the regulation—and a long-term assessment over a 30-year period. The industry-wide impacts analyzed include (1) industry net present value, which values the industry on the basis of expected future cash flows, (2) cash flows by year, (3) changes in revenue and income, and (4) other measures of impact, as appropriate. However, DOE is not amending standards for PTACs and PTHPs, and, therefore, this final determination would have no cash-flow impacts on

manufacturers. Accordingly, as discussed further in section IV.H of this document, DOE did not conduct an MIA for this final determination.

For individual consumers, measures of economic impact include the changes in LCC and payback period ("PBP") associated with new or amended standards. 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 is not amending standards for PTACs and PTHPs, and, therefore, this final determination would have no disproportionate impact on identifiable subgroups of consumers. Accordingly, DOE did not conduct a subgroup analysis for this final determination.

2. Savings in Operating Costs Compared to Increase in Price

EPCA requires DOE to consider the savings in operating costs throughout the estimated average life of the covered product 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 product 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 product prices, product energy consumption, energy prices, maintenance and repair costs, product lifetime, and discount rates appropriate for consumers. To account for uncertainty and variability in specific inputs, such as product 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 a more-efficient product through lower operating costs. DOE calculates the PBP by dividing the change in purchase cost due to a more-stringent standard by the change in annual operating cost for the year that standards are assumed to take effect.

For its LCC and PBP analysis, DOE assumes that consumers will purchase the covered products in the first year of compliance with new or amended 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 IV.F of this document.

3. Energy Savings

Although significant 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 energy savings that are expected to result directly from the standard. (42 U.S.C. 6313(a)(6)(B)(ii)(III)) As discussed in section IV.H of this document, DOE uses the NIA spreadsheet models to project national energy savings.

4. Lessening of Utility or Performance of Products

In establishing product classes and in evaluating design options and the impact of potential standard levels, DOE evaluates potential standards that would not lessen the utility or performance of the considered products. (42 U.S.C. 6313(a)(6)(B)(ii)(IV)) DOE is not amending standards for PTACs and PTHPs, and, therefore, this final determination would not impact the utility 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 standard. (42 U.S.C. 6313(a)(6)(B)(ii)(V)) Because DOE is not amending standards for PTACs and PTHPs, DOE did not transmit a copy of its final 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)) The energy savings from the standards are likely to provide improvements to the security and reliability of the Nation's energy system. 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 standards may affect the Nation's needed power generation capacity. However, DOE is not amending standards for PTACs and PTHPs, and therefore, did not conduct this analysis.

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. The standards are 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. DOE conducts an emissions analysis to estimate how standards may affect these emissions. DOE also estimates the economic value of emissions reductions resulting from each trial standard level ("TSL") (*i.e.*, standards case above the base case).[9] However, DOE is not amending standards for PTACs and PTHPs, and, therefore, did not conduct this analysis.

7. Other Factors

In determining whether an 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."

[9] On March 16, 2022, the Fifth Circuit Court of Appeals (No. 22-30087) granted the federal government's emergency motion for stay pending appeal of the February 11, 2022, preliminary injunction issued in *Louisiana v. Biden*, No. 21-cv-1074-JDC-KK (W.D. La.). As a result of the Fifth Circuit's order, the preliminary injunction is no longer in effect, pending resolution of the federal government's appeal of that injunction or a further court order. The preliminary injunction enjoined the federal government from relying on the interim estimates of the social cost of greenhouse gases—which were issued by the Interagency Working Group on the Social Cost of Greenhouse Gases on February 26, 2021—to monetize the benefits of reducing greenhouse gas emissions. In the absence of further intervening court orders, DOE will revert to its approach prior to the injunction and present monetized benefits in accordance with applicable Executive orders.

IV. Methodology and Discussion of Related Comments

This section addresses the analyses DOE has performed for this final determination with regard to PTACs and PTHPs. Separate subsections address each component of DOE's analyses.

DOE used several analytical tools to estimate the impact of the standards considered in this document. The first tool is a spreadsheet that calculates the LCC savings and PBP of potential energy conservation standards. The NIA uses a second spreadsheet set that provides shipments projections and calculates NES and net present value of total consumer costs and savings expected to result from potential energy conservation standards. These spreadsheet tools are available on the website for this rulemaking: *www.regulations.gov/docket/EERE-2019-BT-STD-0035*.

A. Comments Received on the Proposed Determination

The CA IOUs supported the DOE analysis presented in the NOPD and agreed with DOE's determination that it lacks evidence that more stringent standards for PTAC and PTHP equipment would be technologically or economically justified. (CA IOUs, No. 19 at p. 1). NYSERDA also acknowledged that based on current information, DOE has insufficient information to update the standards for PTAC and PTHP equipment, but strongly encouraged DOE to include cold climate performance into the next rulemaking. (NYSERDA, No. 18 at p. 1).

The Joint Advocates encouraged DOE to establish energy conservation standards for PTACs and PTHPs based on a part-load cooling performance metric and a heating

metric that incorporates low temperature performance as soon as possible. Additionally, the Joint Advocates commented that they understand that DOE's proposed determination satisfies the EPCA 6-year lookback requirement, but noted that should DOE issue a final determination not to amend standards, DOE would be required to publish another NOPD or notice of proposed rulemaking within three years of the publication of the determination. (Joint Advocates, No. 20 at p. 1)

In response to NEEA and Joint Advocates respective suggestions of including cold climate performance and part-load cooling and heating performance in the next rulemaking, DOE notes that the current test procedure does not account for cold climate performance or part-load cooling and heating performance. At present, DOE is unable to consider energy savings from a part-load metric or low temperature heating performance. DOE will consider these comments in the ongoing test procedure rulemaking. If DOE amends the PTAC and PTHP test procedure to incorporate these changes, DOE will conduct an analysis for future standards rulemakings, if any, based on the amended test procedure. DOE concurs with the Joint Advocates that DOE would be required to publish another NOPD or NOPR within three years of the publication of this determination.

AHRI agreed with DOE's assessment that DOE lacked clear and convincing evidence that more-stringent standards for PTACs and PTHPs would be economically justified noting that the PTAC/PTHP efficiency levels remain unchanged from ASHRAE 90.1-2013. AHRI stated agreement with DOE's still codified belief, "that ASHRAE not acting to amend Standard 90.1 is tantamount to a decision that the existing standard

remain in place." AHRI urged DOE to apply this same statutorily mandated process to the PTAC/PTHP test procedure and rulemaking sequencing. (AHRI, No. 21 at p. 1-2). AHRI commented that DOE did not follow the process specific to ASHRAE equipment, which, AHRI asserted, requires that within 18 months (plus 180 days) of publication of ASHRAE Standard 90.1, DOE is required to consider amending the existing test procedures when ASHRAE Standard 90.1 is amended with respect to test procedures. *Id.* AHRI stated that DOE has ignored these provisions and has not provided any explanation regarding either the deviation from the correct sequencing of rulemakings, or the disregard of the promulgation. AHRI urged DOE to adopt AHRI 310/380-2017, which is the standard cited in ASHRAE Standard 90.1, asserting that this test procedure has been deemed representative in past rulemakings, including in the analysis underpinning this energy conservation standard. AHRI additionally stated that no manufacturer has submitted a waiver to modify the current test procedure, which indicates that the results of the existing test procedure remain representative of actual energy use or efficiency, and that all products defined as PTACs and PTHPs are able to be tested in accordance with AHRI 310/380. AHRI asserted that DOE's failure to abide by its own regulations by timely adopting the ASHRAE 90.1–2019 testing standards disingenuously triggered the Department's 7-year lookback test procedure review. (AHRI, No. 21 at p. 3).

In response to AHRI's comment, DOE must first correct a fundamental misunderstanding of the 7-yr lookback process reflected in AHRI's comment that DOE "disingenuously" triggered this process. AHRI seems to be under the mistaken impression that DOE can only review a test procedure once every 7 years. DOE would direct AHRI to the statutory provision in EPCA regarding the 7-yr lookback for test

procedures, which states that "[a]t least once every 7 years" DOE shall evaluate the test procedure for each class of covered equipment. (42 U.S.C. 6314(a)(1)) This language clearly allows for multiple reviews within a 7-yr period. As a result, there is simply no need for DOE to wait 7 years to conduct a review under this process. As such, AHRI's assertion that DOE "disingenuously" initiated a review under 42 U.S.C. 6314(a)(1) is entirely without merit.

Additionally, DOE acknowledges that appendix A currently contains language that "ASHRAE not acting to amend Standard 90.1 is tantamount to a decision that existing standard remain in place." 10 CFR part 430, subpart C, appendix A, section 9(c). But DOE notes that this statement does not have any effect on DOE's rulemaking obligations under the ASHRAE provision in EPCA. These provisions require DOE to: (1) initiate rulemakings when the relevant industry standard or test procedure has been amended (*See* 42 U.S.C. 6313(a)(6)(A) and 42 U.S.C. 6314(a)(4)(B)); and (2) periodically review standards and test procedures for ASHRAE equipment (*See* 42 U.S.C. 6313(a)(6)(C) and 42 U.S.C. 6314(a)(1)(A)).Neither of these situations would be affected by a decision by ASHRAE to reaffirm an existing standard. As such, DOE notes that is has proposed to remove this statement in a NOPR proposing updates to appendix A. 86 FR 35668, 35676.

DOE would also like to clarify the timelines associated with promulgating rulemaking documents. For energy conservation standards, EPCA provides that no later than 18 months after the publication of an amended version of ASHRAE/IES Standard, 90.1, DOE will establish an amended standard at the level specified by ASHRAE. 42

U.S.C. 6313(a)(6)(A) Conversely, for test procedures, EPCA does not provide an 18-month window for adopting an amended ASHRAE test procedure. *See* 42 U.S.C. 6314(a)(4). DOE notes that the Process Rule erroneously applies EPCA's timelines for energy conservation standards for ASHRAE equipment to test procedures. 86 FR 35668, 35676; see also 10 CFR part 430, subpart C, appendix A, section 9(a). Given this error and DOE's proposal to address the error, DOE is following the statutory requirements in EPCA.

Regarding the adoption of AHRI 310/380-2017, DOE notes that DOE's current test procedure for PTACs and PTHPs incorporates by reference AHRI 310/380-2014. The current test procedures also include additional provisions in paragraphs (c) and (e) of 10 CFR 431.96. 10 CFR 431.96(b)(1). As noted in an early assessment RFI published on December 7, 2020, AHRI 310/380-2017 and AHRI 310/380-2014 differ only in that AHRI 310/380-2017 incorporates DOE's additional PTAC and PTHP test procedure specifications listed above. *See* 85 FR 78967, 78969. EPCA states that if the AHRI or ASHRAE industry standard is updated, DOE will amend the test procedure for the product as necessary to be consistent with the amended industry test procedure. (42 U.S.C. 6314 (a)(4)(B)) As the DOE test procedures for PTACs and PTHPs were already consistent with AHRI 310/380-2017, DOE did not see any need for action arising from the publication of ASHRAE 90.1-2019. Therefore, DOE proceeded with the test procedure rulemaking under the 7-year lookback review and has not deviated from process as asserted by AHRI. Because AHRI 310/380-2017 has not been officially incorporated in the DOE test procedures for PTACs and PTHPs, DOE has not an explicit determined in any past rulemaking whether the standard is representative or not.

Furthermore, DOE corrects AHRI that the analysis underpinning this energy conservation standard determination is based on the current DOE test procedures, which incorporate AHRI 310/380-2014.

Comments pertaining to the technology and screening analysis are presented in sections IV.B.3and IV.B.4 of this document. DOE did not receive any further comments regarding its proposed determination in the June 2022 NOPD. Therefore, in this final determination, DOE relies on the analysis presented in the June 2022 NOPD and as summarized in sections IV.B to IV.H of this document.

B. Market and Technology Assessment

DOE develops information in the market and technology assessment that provides an overall picture of the market for the products concerned, including the purpose of the products, the industry structure, manufacturers, market characteristics, and technologies used in the products. 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 final determination include: (1) a determination of the scope of the rulemaking and classes, (2) market and industry trends and (3) technologies or design options that could improve the energy efficiency of PTAC and PTHPs. The key findings of DOE's market assessment are summarized in the following sections. See the supplemental file DOE made available for comment (Document ID No. EERE-2019-BT-STD-0035-0001) for a review of the current PTAC and PTHP market and efficiency distributions.

1. Scope of Coverage

In this analysis, DOE relied on the definition of PTACs and PTHPs in 10 CFR 431.92. Any equipment meeting the definition of PTAC or PTHP is included in DOE's scope of coverage.

PTAC is defined as a wall sleeve and a separate un-encased combination of heating and cooling assemblies specified by the builder and intended for mounting through the wall, and that is industrial equipment. 10 CFR 431.92. It includes a prime source of refrigeration, separable outdoor louvers, forced ventilation, and heating availability by builder's choice of hot water, steam, or electricity. *Id.*

PTHP is defined as a PTAC that utilizes reverse cycle refrigeration as its prime heat source, that has a supplementary heat source available, with the choice of hot water, steam, or electric resistant heat, and that is industrial equipment. *Id.*

On October 7, 2008, DOE published a final rule ("October 2008 final rule") amending the energy conservation standards for PTACs and PTHPs in which DOE divided equipment classes based on whether a PTAC or PTHP is a standard size or non-standard size. 73 FR 58772, 58783.

DOE defines "standard size" as a PTAC or PTHP with wall sleeve dimensions having an external wall opening of greater than or equal to 16 inches high or greater than or equal to 42 inches wide, and a cross-sectional area greater than or equal to 670 square inches. 10 CFR 431.92.

DOE defines "non-standard size" as a PTAC or PTHP with existing wall sleeve dimensions having an external wall opening of less than 16 inches high or less than 42 inches wide, and a cross-sectional area less than 670 square inches. *Id.*

2. Equipment Classes

For PTACs and PTHPs, the current energy conservation standards specified in 10 CFR 431.97(c) are based on 12 equipment classes determined according to the following: whether the equipment is an air conditioner or a heat pump, whether the equipment is standard size or non-standard size, and the cooling capacity in Btu/h. Table IV-1 lists the current 12 equipment classes for PTACs and PTHPs specified in Table 7 and Table 8 to 10 CFR 431.97.

Table IV.1. Current PTAC and PTHP Equipment Classes

Equipment Class			
1	PTAC	Standard Size	<7,000 Btu/h
2	PTAC	Standard Size	≥7,000 Btu/h and ≤15,000 Btu/h
3	PTAC	Standard Size	>15,000 Btu/h
4	PTAC	Non-Standard Size	<7,000 Btu/h
5	PTAC	Non-Standard Size	≥7,000 Btu/h and ≤15,000 Btu/h
6	PTAC	Non-Standard Size	>15,000 Btu/h
7	PTHP	Standard Size	<7,000 Btu/h
8	PTHP	Standard Size	≥7,000 Btu/h and ≤15,000 Btu/h
9*	PTHP	Standard Size	>15,000 Btu/h
10	PTHP	Non-Standard Size	<7,000 Btu/h
11	PTHP	Non-Standard Size	≥7,000 Btu/h and ≤15,000 Btu/h
12	PTHP	Non-Standard Size	>15,000 Btu/h

*Based on DOE's review of equipment currently available on the market, DOE did not identify any Standard Size PTHP models with a cooling capacity greater than 15,000 Btu/h.

a. Make-up Air PTACs and PTHPs

In the May 2021 TP RFI, DOE described "make-up air" PTACs and their additional function of dehumidification. *See* 86 FR 28005, 28007-28009. These PTAC and PTHP models are designed to draw outdoor air into the unit, dehumidify the outdoor air, and introduce the dehumidified air into the conditioned space. *Id.* As discussed in section II.B.1, for PTACs and PTHPs, DOE currently specifies EER as the test metric for cooling efficiency and COP as the metric for heating efficiency. Neither the current test procedure, at 10 CFR 431.96(g), nor the industry test procedure incorporated by reference, AHRI Standard 310/380-2014, account for the energy associated with the conditioning of make-up air introduced by the unit.

DOE is cognizant of the potential testing challenges associated with the testing of make-up air PTACs and PTHPs and is considering several issues pertaining to this testing in the ongoing test procedure rulemaking. *See* 86 FR 28005, 28008-28009. Were DOE to amend the PTAC and PTHP test procedure to incorporate measurement of dehumidification energy for make-up air PTACs and PTHPs, a separate equipment class for this type of units may be warranted. At such time, DOE would conduct the analysis for future standards rulemakings, if any, based on the amended test procedure. However, DOE will not establish separate equipment classes for make-up air PTACs and PTHPs at this time.

3. Technology Options

In the June 2022 NOPD, DOE considered the technology options shown in Table IV-2, which included options suggested by stakeholders in response the December 2020 ECS RFI. *See* 87 FR 37934, 37943-37944.

Table IV.2. Potential Technology Options for Improving Energy Efficiency of PTACs and PTHPs

Technology Options		Source
Heat Exchanger Improvements	Increased Heat Exchanger Area	July 2015 Final Rule
	Microchannel Heat Exchangers	Screened out of July 2015 final rule; Suggested for Inclusion by Commenter
Indoor Blower and Outdoor Fan Improvements	Higher Efficiency Fan Motors	July 2015 Final Rule
	Improved Air Flow and Fan Design (including more Efficient Fan Geometries)	July 2015 Final Rule
	Variable speed condenser fan/motor	New Technology Option
	Variable speed indoor blower/motor	New Technology Option
	Separate indoor and outdoor motors (to improve efficiency while reducing noise)	New Technology Option Suggested by Commenter
Compressor Improvements	Higher Efficiency Compressors	July 2015 Final Rule
	Scroll Compressors	Screened out of July 2015 Final Rule
	Variable Speed Compressors	July 2015 Final Rule*
Other Improvements	Heat Pipes	Screened out of July 2015 Final Rule
	Alternative Refrigerants	Screened out of July 2015 Final Rule
	EEV	New Technology Option
	TEV	July 2015 Final Rule*
	Intake and Exhaust Ducts (to reduce infiltration through and around the unit)	New Technology Option Suggested by Commenter
	Defrost Control Strategies & Demand-based Defrost Controls (for improved low ambient heating)	New Technology Option Suggested by Commenters
	Electric resistance boost control strategies (to limit the use of electric resistance boost)	New Technology Option Suggested by Commenter
	Compressor cut out control strategies (to allow compressor operation at lower temperatures)	New Technology Option Suggested by Commenter

*Identified technology was not analyzed in the July 2015 final rule because of no full-load benefit.[10]

NYSERDA commented that they supported the inclusion of technology options that sought to address cold climate performance, including compressor cut out control strategies and defrost control strategies. (NYSERDA No. 18 at p. 2) Additionally,

[10] Detailed descriptions of the technology options from the July 2015 final rule can be found in chapters 3 and 4 of the July 2015 final rule technical support document ("TSD") available at *www.regulations.gov/document/EERE-2012-BT-STD-0029-0040.*

NYSERDA highlighted that heating performance at 5°F was being promoted in the Northeast; citing the Northeast Energy Efficiency Partnership's (NEEP) Cold Climate Heat Pump list, which includes packaged terminal products capable of demonstrating high performance down to 5°F. *Id.* NYSERDA encouraged DOE to prioritize development of a single metric that captures at the very least heating performance at 47°F and 17°F, and further encouraged DOE to include an optional tests at 5°F and the lowest catalogued outdoor dry bulb temperature. *Id.*

As discussed, DOE will consider NYSERDA's comments regarding the development of the heating metric in the ongoing test procedure rulemaking.

4. 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 significant adverse impact on the utility of the product to 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.

See 10 CFR part 430, subpart C, appendix A, sections 6(c)(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

a. Screened-Out Technologies

In the June 2022 NOPD, DOE screened out three technology options based on the applicable criteria discussed previously. *See* 87 FR 37934, 37945-37946. The screened-out technology options are presented below in Table IV-3.

Table IV.3. Screened Out Technology Options in the June 2022 NOPD

	Screening Criteria (X = Basis for Screening Out)				
Screened Technology Option	**Technological Feasibility**	**Practicability to Manufacture, Install, and Service**	**Adverse Impact on Equipment Utility**	**Adverse Impacts on Health and Safety**	**Unique-Pathway Proprietary Technologies**
Scroll Compressors	**X**				
Heat Pipes	**X**				
Alternative Refrigerants	**X**				

In regard to alternate refrigerants, the Joint Advocates encouraged DOE to conduct testing and research on the impact alternative refrigerants can have with PTAC and PTHP equipment for future standards rulemaking. Additionally, the Joint Advocates encouraged DOE to perform its own testing, interviews, or research to better understand the energy impact of alternative refrigerants. (Joint Advocates, No. 20 at p. 2)

As discussed in the June 2022 NOPD, DOE reviewed several studies to gauge the potential efficiency improvements alternative refrigerants could provide in comparison to R-410a refrigerants. *See* 87 FR 37934, 37948. Most of these studies were conducted in

drop-in applications and were not performed on PTAC or PTHP equipment specifically. *Id.* DOE may look to conduct physical testing with alternate refrigerants in the future to better evaluate the efficiency benefits associated with them. However, at this point, DOE does not have any physical test data and is therefore keeping alternative refrigerants screened out.

b. Other Technologies Not Considered in the Engineering Analysis

Typically, energy-saving technologies that pass the screening analysis are evaluated in the engineering analysis. However, in some cases technologies are not included in the analysis for reasons other than the screening criteria. These are discussed in the following paragraphs.

Technologies Previously Eliminated from the July 2015 final rule

In the July 2015 final rule, DOE identified several technology options that were not included in the engineering analysis because of three additional considerations: (1) efficiency benefits of the technologies were negligible; (2) data was not available to evaluate the energy efficiency characteristics of the technology; and/or (3) test procedure and EER and COP metrics did not measure the energy impact of the technology. *See* 80 FR 43161, 43172; 79 FR 55538, 55555-55556 (September 16, 2014). In the June 2022 NOPD, DOE maintained its position that these technologies should remained eliminated. *See* 87 FR 37934, 37948. These technologies are listed below under each consideration:

(1) Efficiency benefits of the technologies were negligible:

- Re-circuiting heat exchanger coils;
- Rifled interior tube walls;

(2) Data was not available to evaluate the energy efficiency characteristics of the technology:

- Microchannel heat exchangers;

(3) Test procedure and EER and COP metrics did not measure the energy impact of the technology:

- Variable speed compressors;
- Complex control boards (fan motor controllers, digital "energy management" control interfaces, heat pump controllers);
- Corrosion protection;
- Hydrophobic material treatment of heat exchangers;
- Clutched motor fans; and
- TEVs.

Technology Options Benefiting Part-load and Low Temperature Performance

In the June 2022 NOPD, noting that the current EER and COP metrics do not measure part-load performance and low temperature heating performance, DOE proposed to exclude the following technologies from the engineering analysis:

- Variable speed condenser fan/motor;
- Variable speed indoor blower/motor;

- Variable speed compressors;
- TEVs
- EEVs
- Defrost control strategies
- Electric resistance boost control strategies
- Compressor cut-out controls

87 FR 37934, 27949

As discussed, DOE stated it may consider adopting for PTACs and PTHPs a cooling-mode metric that integrates part-load performance and a heating metric that includes performance at low ambient temperatures in the ongoing test procedure rulemaking. *See* 86 FR 28005, 28009-28011. If DOE amends the PTAC and PTHP test procedure to incorporate these changes, it will conduct any analysis for future standards rulemakings, if any, based on the amended test procedure. DOE is still evaluating potential amendments to the test procedure. At present, DOE is unable to consider energy savings from a part-load metric or low temperature heating performance.

c. Remaining Technologies

After reviewing each technology, DOE did not screen out the following technology options and considers them as design options in the engineering analysis. These technology options are the same as those retained in the July 2015 final rule:

1) Higher Efficiency Compressors
2) Higher Efficiency Fan Motors

3) Increased Heat Exchanger Area

4) Improved Air Flow and Fan Design

DOE has 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 and improve efficiency as determined by the DOE test procedure. For additional details on the technologies included in the engineering analysis, see chapter 4 of the July 2015 final rule TSD.

C. Engineering Analysis

The purpose of the engineering analysis is to establish the relationship between the efficiency and cost of PTACs and PTHPs. There are two elements to consider in the engineering analysis; the selection of efficiency levels to analyze (*i.e.*, the "efficiency analysis") and the determination of product 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 evaluated, DOE estimates the baseline cost, as well as the incremental cost for the product/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 products (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 the July 2015 final rule, DOE adopted an efficiency-level approach combined with a cost-assessment approach to determine the cost-efficiency relationship. *See* 80 FR 43162, 43173. In the June 2022 NOPD, based on the technology options considered and a review of available efficiencies in the market, DOE concluded that the available efficiencies on the market have not significantly changed since the 2015 rulemaking. *See* 87 FR 37934, 37949. DOE's review of current PTAC and PTHP designs also led to the conclusion that design options used to achieve higher EER and/or COP have not changed since 2015. *Id.* In this final determination, DOE utilized the same analysis as in the July 2015 final rule, but with updated costs to account for inflation and other effects. As

discussed in section IV.A, DOE's proposed determination was generally supported by commenters and no alternative analysis methodology was presented. Thus, DOE did not revise the NOPD analysis, concluding that it is representative of the relationship between costs and potential increase in efficiency.

The methodology used to perform the analysis and derive the cost-efficiency relationship is described in chapter 5 of the July 2015 final rule TSD.

2. Equipment Classes Analyzed

In the July 2015 final rule, DOE developed its engineering analysis for the six equipment classes associated with standard-size PTACs and PTHPs. *See* 80 FR 43162, 43174-43177. DOE did not conduct an engineering analysis for non-standard size equipment classes because of their low and declining market share and because of a lack of adequate information to analyze these units. *See* 80 FR 43162, 43174.

In the June 2022 NOPD, DOE proposed to analyze the same equipment classes as in the July 2015 final rule. *See* 87 FR 37934, 27950. DOE did not receive any comments in relation to this, and is analyzing the same equipment classes in this final determination.

Table IV-4 sets out the equipment classes analyzed in this rulemaking.

Table IV.4. Equipment Classes Analyzed in this Rulemaking

Equipment Class		
Equipment	**Category**	**Cooling Capacity**
PTAC	Standard Size	< 7,000 Btu/h
		≥ 7,000 Btu/h and ≤ 15,000 Btu/h
		> 15,000 Btu/h
PTHP	Standard Size	< 7,000 Btu/h
		≥7 ,000 Btu/h and ≤ 15,000 Btu/h
		> 15,000 Btu/h

3. Baseline Efficiency Levels

DOE considered the current minimum energy conservation standards to establish the baseline efficiency levels for each standard size equipment class, using the 9,000 btu/h and 15,000 Btu/h cooling capacities as representative capacities for the standard size equipment classes. The baseline efficiency levels for the analyzed representative units are presented below in Table IV-5.

Table IV.5. Baseline Efficiency Levels

Equipment Type	Equipment Class	Baseline Efficiency Equation	Cooling Capacity	Baseline Efficiency Level
PTAC	Standard Size	EER = 14.0 – (0.300 x Cap†/1000)	9,000 Btu/h	11.3 EER
			15,000 Btu/h	9.5 EER
PTHP	Standard Size	EER = 14.0 – (0.300 x Cap†/1000)	9,000 Btu/h	11.3 EER 3.2 COP
		COP = 3.7 – (0.052 x Cap†)	15,000 Btu/h	9.5 EER 2.9 COP

† Cap means cooling capacity in thousand Btu/h at 95°F outdoor dry-bulb temperature.

4. Maximum Available and Maximum Technologically Feasible Levels

As part of DOE's analysis, the maximum available efficiency level is the highest efficiency unit currently available on the market. DOE also considers the max-tech efficiency level, which it defines as the level that represents the theoretical maximum possible efficiency if all available design options are incorporated in a model. In many cases, the max-tech efficiency level is not commercially available because it is not economically feasible.

In the June 2022 NOPD, DOE noted that since the screened in design options for the engineering analysis were the same as those considered in the July 2015 final rule and the available efficiencies have not significantly changed since the 2015 rulemaking, DOE saw no reason to revise the max-tech levels. *See* 87 FR 37934, 37951.

DOE did not receive any comments pertaining to the max-tech levels presented in the June 2022 NOPD. Therefore, in this final determination, DOE maintains the same max-tech levels as those in the 2015 rulemaking. Table IV.6 shows the max-tech efficiency levels.

Table IV.6. Max-tech and Maximum-Available Efficiency Levels

Equipment Class	Max-tech July 2015 final rule[a]	Maximum-Available Current Market
Standard Size PTAC <7,000 Btu/h	13.8 EER[b]	13.0 EER
Standard Size PTAC ≥7,000 Btu/h and ≤15,000 Btu/h	EER = 16.3 – (0.354 x Cap[c])	EER = 15.8 – (0.308 x Cap[c])[d]
Standard Size PTAC >15,000 Btu/h	11.0 EER	9.7 EER
Standard Size PTHP <7,000 Btu/h	13.8 EER[b] 3.8 COP[b]	13.1 EER 4.0 COP
Standard Size PTHP ≥7,000 Btu/h and ≤15,000 Btu/h	EER = 16.3 – (0.354 x Cap[c]) COP = 4.3 – (0.073 x Cap[c])	EER = 15.8 – (0.308 x Cap[c])[d] COP = 4.6 – (0.075 x Cap[c])[d]
Standard Size PTHP >15,000 Btu/h[3]	11.0 EER 3.2 COP	N/A[e]

a. *a. See Table IV.4 at 80 FR 43162, 43175*
b. b. Based on Max Tech equation shown for Standard Size PTACs and PTHPs, ≥7,000 Btu/h and ≤15,000 Btu/h at a value of 7,000 Btu/h.
c. c. Cap means cooling capacity in thousand Btu/h.
d. d. Based on method of creating a linear fit between the two models in the CCD Database that were the highest absolute value above the baseline.
e. e. Based on DOE's review of equipment currently available on the market, DOE did not identify any PTHP models with a cooling capacity greater than 15,000 Btu/h.
f.

5. Incremental Efficiency levels

In the June 2022 NOPD, DOE analyzed several incremental efficiency levels between the baseline and max-tech levels and obtained incremental cost data at each of these levels. *See* 87 FR 37934, 37952. DOE considered five efficiency levels beyond the baseline efficiency level up to the max-tech level for each equipment class. These levels were 2.2, 6.2, 10.2, 14.2 and 16.2 precents more efficient than the amended PTAC and PTHP standards that became effective on July 21, 2015, and are the same incremental efficiency levels evaluated in the July 2015 final rule. *Id.*

DOE is utilizing the same incremental efficiency levels in this final determination. These levels are presented in Table IV-7.

Table IV-7. Incremental Efficiency Levels for Standard Size PTACs and PTHPs

Equipment Type	Cooling Capacity	Efficiency Levels (Percentages relative to 2015 ECS)					
		Baseline*	**EL1, 2.2%**	**EL2, 6.2%**	**EL3, 10.2%**	**EL4, 14.2%**	**EL5, 16.2% (Max-Tech)**
PTAC	All, EER	14.0 - (0.300 x Cap†)	14.4 - (0.312 x Cap†)	14.9 - (0.324 x Cap†)	15.5 - (0.336 x Cap†)	16.0 - (0.348 x Cap†)	16.3 - (0.354 x Cap†)
	9,000 Btu/h	11.3 EER	11.5 EER	12.0 EER	12.4 EER	12.9 EER	13.1 EER
	15,000 Btu/h	9.5 EER	9.7 EER	10.0 EER	10.4 EER	10.8 EER	11.0 EER
Equipment Type	**Cooling Capacity**	**Baseline***	**EL1, 2.2%**	**EL2, 6.2%**	**EL3, 10.2%**	**EL4, 14.2%**	**EL5, 16.2% (Max-Tech)**
PTHP	All, EER	14.0 - (0.300 x Cap†)	14.4 - (0.312 x Cap†)	14.9 - (0.324 x Cap†)	15.5 - (0.336 x Cap†)	16.0 - (0.348 x Cap†)	16.3 - (0.354 x Cap†)
	All, COP	3.7 - (0.052 x Cap†)	3.8 - (0.058 x Cap†)	4.0 - (0.064 x Cap†)	4.1 - (0.068 x Cap†)	4.2 - (0.070 x Cap†)	4.3 - (0.073 x Cap†)
	9,000 Btu/h	11.3 EER 3.2 COP	11.5 EER 3.3 COP	12.0 EER 3.4 COP	12.4 EER 3.5 COP	12.9 EER 3.6 COP	13.1 EER 3.6 COP
	15,000 Btu/h	9.5 EER 2.9 COP	9.7 EER 2.9 COP	10.0 EER 3.0 COP	10.4 EER 3.1 COP	10.8 EER 3.2 COP	11.0 EER 3.2 COP

*This level represents the current Federal minimum standards for PTAC and PTHP equipment.
† Cap means cooling capacity in thousand Btu/h at 95°F outdoor dry-bulb temperature.

6. 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 product, 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 a commercially available product, component-by-component, to develop a detailed bill of materials for the product.

- *Catalog teardowns:* In lieu of physically deconstructing a product, DOE identifies each component using parts diagrams (available from manufacturer websites or appliance repair websites, for example) to develop the bill of materials for the product.

- *Price surveys:* If neither a physical nor catalog teardown is feasible (for example, 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 July 2015 final rule, DOE performed a cost analysis that involved testing and then conducting physical teardowns on several test units to develop a manufacturing cost model and to evaluate key design features (e.g., improved heat exchangers, compressors, fans/fan motors). *See* 80 FR 43162, 43176. In the June 2022 NOPD, DOE noted that the design options being considered in this rulemaking are the same as in the 2015 rulemaking and the efficiency distributions for available PTACs and PTHPs have not changed compared to the 2015 rulemaking. *See* 87 FR 37934, 37952-37953. Therefore, DOE utilized the same cost analysis conducted for the July 2015 final rule, but adjusted the analysis for inflation and other market effects. *Id.* at *See* 87 FR 37953. To adjust the cost analysis, DOE used industry specific producer price index ("PPI") data published by the Bureau of Labor Statistics ("BLS"). The PPI measures the average change over time in the selling prices from the perspective of the seller. DOE evaluated the change in PPI from the year 2013 (used in the previous rulemaking) to year 2021 (current rulemaking), and used the percent increase to scale the manufacturer production costs ("MPCs") from the previous rulemaking. *Id.* In this final determination, DOE is using the same approach as in the June 2022 NOPD.

7. Cost-efficiency Results

The results of the engineering analysis are reported as a set of cost-efficiency data (or "curves") in the form of MPC (in dollars) versus EER, which form the basis for other analyses in the final determination. DOE created cost-efficiency curves for the two representative cooling capacities within the two standard-size equipment classes of PTACs and PTHPs, as discussed in section IV.C.2 previously. DOE developed the

incremental cost-efficiency results shown in Table IV-8 for each representative cooling capacity. These cost results are incremented from a baseline efficiency level equivalent to the current federal minimum standards.

Table IV.7. Incremental Manufacturing Production Costs (MPC) for Standard Size PTACs and PTHPs

Equipment Type	Cooling Capacity	Efficiency Levels					
		Baseline*	**EL1**	**EL2**	**EL3**	**EL4**	**EL5**
PTAC	9,000 Btu/h	$0.00	$5.22	$15.36	$26.32	$38.11	$44.31
	15,000 Btu/h	$0.00	$5.00	$18.71	$36.37	$58.00	$70.30
		Baseline*	**EL1**	**EL2**	**EL3**	**EL4**	**EL5**
PTHP	9,000 Btu/h	$0.00	$5.22	$15.36	$26.32	$38.11	$44.31
	15,000 Btu/h	$0.00	$5.00	$18.71	$36.37	$58.00	$70.30

* This level represents the current federal minimum standards for PTAC and PTHP equipment

To account for manufacturers' non-production costs and profit margin, DOE applied 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 this final determination, DOE retained the manufacturer markup of 1.27 from the June 2022 NOPD. *See* 87 FR 37934, 37954.

D. Markups Analysis

The markups analysis develops appropriate markups (*e.g.*, retailer markups, distributor markups, contractor markups) in the distribution chain and sales taxes to convert the MSP estimates 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 July 2015 final rule, DOE identified four distribution channels for PTACs and PTHPs to describe how the equipment passes from the manufacturer to the consumer. *See* 80 FR 43162, 43177. The four distribution channels are listed below:

The first distribution channel is only used in the new construction market, and it represents sales directly from a manufacturer to the end use customer through a national account.

Manufacturer ➔ National Account ➔ End user

The second distribution channel represents replacement markets, where a manufacturer sells to a wholesaler, who sells to a mechanical contractor, who in turn sells to the end user.

Manufacturer ➔ Wholesaler ➔ Mechanical Contractor ➔ End user

The third distribution channel, which is used in both new construction and replacement markets, the manufacturer sells the equipment to a wholesaler, who in turn sells it to a mechanical contractor, who in turn sells its to a general contractor, who sells it to the end user.

Manufacturer ➔ Wholesaler ➔ Mechanical Contractor ➔
General Contractor ➔ End user

Finally, in the fourth distribution channel, which is also used in both the new construction and replacement markets, a manufacturer sells to a wholesaler, who in turn sells directly to the end user.

Manufacturer ➔ Wholesaler ➔ End User

80 FR 43162, 43177.

In the June 2022 NOPD, DOE did not update the distribution channels from the July 2015 rule. DOE considered the four distribution channels shown in Table IV.8 and estimated percentages of the total sales in the new construction and replacement markets for each of the four distribution channels as listed in Table IV.9. *See* 87 FR 37934, 37954.

Table IV.8. Distribution Channels for PTAC and PTHP Equipment

Channel 1	Channel 2	Channel 3	Channel 4
Manufacturer (through national accounts)	Manufacturer	Manufacturer	Manufacturer
	Wholesaler	Wholesaler	Wholesaler
		Mechanical Contractor	Mechanical Contractor
			General Contractor
Consumer	Consumer	Consumer	Consumer

Table IV.9. Share of Market by Distribution Channel for PTAC and PTHP Equipment

Distribution Channel	New Construction	Replacement
Wholesaler-Consumer	30%	15%
Wholesaler-Mech Contractor-Consumer	0%	25%
Wholesaler-Mech Contractor-General Contractor-Consumer	38%	60%
National Account	32%	0%
Total	100%	100%

In the June 2022 NOPD, DOE updated the sources used in the July 2015 final rule to derive markups for each step of the distribution channels with the following data sources: (1) the 2017 Annual Wholesale Trade Survey,[11] to develop wholesaler markups; (2) the Air Conditioning Contractors of America's ("ACCA") "2005 Financial Analysis for the HVACR Contracting Industry"[12] and 2017 U.S. Census Bureau economic data[13] to develop mechanical contractor markups; and (3) 2017 U.S. Census Bureau economic data for the commercial and institutional building construction industry to develop general contractor markups[14]. *See* 87 FR 37934, 37954. 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.

[11] U.S. Census Bureau. *2017 Annual Wholesale Trade Report, NAICS 4236: Household Appliances and Electrical and Electronic Goods Merchant Wholesalers*. 2017. Washington, D.C. *www.census.gov/wholesale/index.html*.

[12] "2005 Financial Analysis for the HVACR Contracting Industry," Air Conditioning Contractors of America. 2005.

[13] "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*

[14] "2017 Economic Census, Construction Industry Series and Wholesale Trade Subject Series," U.S. Census Bureau. Available online at *https://www.census.gov/data/tables/2017/econ/economic-census/naics-sector-23.html*.

DOE received no comments in response to its markups analysis in the NOPD and maintains this analysis in this final determination. Chapter 6 of the final determination TSD provides details on DOE's development of the markups.

E. Energy Use Analysis

The purpose of the energy use analysis is to determine the annual unit energy consumption ("UEC") of PTACs and PTHPs at different efficiencies in representative U.S. commercial buildings, and to assess the energy savings potential of increased PTAC and PTHP efficiency. The energy use analysis estimates the range of energy use of PTACs and PTHPs in the field (*i.e.*, as they are actually used by 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 June 2022 NOPD, in response to stakeholder comments on the December 2020 ECS RFI, DOE developed a new energy use analysis compared to the 2015 Final Rule. 87 FR 37934, 37954-56. To develop UECs, DOE began with the cooling and heating loads from the new construction 2004 vintage, small hotel commercial reference building prototype.[15] *Id.* While more recent prototypes are available that reflect more current building codes, DOE notes that its energy use analysis is meant to represent the energy use in the current stock of buildings that use PTACs and PTHPs and the 2004

[15] *https://www.energy.gov/eere/buildings/new-construction-commercial-reference-buildings*

prototype is more reflective of the stock than a newer prototype.[16] This prototype is a four floor, rectangular building with 35 guest rooms, each of which uses a PTAC for cooling and heating. The cooling and heating loads were developed in EnergyPlus[17] using TMY3 weather data along with the default assumptions for building envelope, ventilation, occupancy schedule, cooling and heating thermostat set points, and square footage. A detailed description of the small hotel commercial reference building can be found on the DOE commercial reference building website.[18] The UECs were developed only using the guestroom load profiles and the PTHP UECs use the heat-pump to meet the heating loads.

Of the 35 hotel rooms in the small hotel commercial reference building prototype, 20 have a design day size below 10,000 Btu/h and the others have design day sizes above 20,000 Btu/h. The largest standard size PTACs and PTHPs in CCD[19] are less than 17,000 Btu/h, therefore, DOE did not consider the small hotel guestroom loads with design days over 20,000 Btu/h. To create full load cooling and heating hours, for each climate zone DOE took the sum of the cooling and heating loads from the 20 guestrooms with a design day size below 10,000 Btu/h and divided them by the sum of the design day capacities for the same hotel guestrooms. DOE then took the full-load cooling and heating hours and multiplied them by the full-load cooling and heating power for each

[16] In Commercial Buildings Energy Consumption Survey ("CBECS") 2018, 80% of lodging buildings that use an individual room air conditioner were constructed prior to the year 2000.
[17] *https://www.energy.gov/eere/buildings/downloads/energyplus-0.*
[18] *https://www.energy.gov/eere/downloads/reference-buildings-building-type-small-hotel.*
[19] Available at: *www.regulations.doe.gov/certification-data/CCMS-4-Air_Conditioners_and_Heat_Pumps_-_Package_Terminal.html#q=Product_Group_s%3A%22Air%20Conditioners%20and%20Heat%20Pumps%20-%20Package%20Terminal%22* (last accessed, 3/25/2022).

efficiency level. The full-load cooling power was derived by dividing the representative cooling capacity of either 9,000 Btu/h or 15,000 Btu/h by the EERs of the representative efficiency levels. The heating power for PTHPs was derived by converting the 9,000 Btu/h and 15,000 Btu/h capacities into Watts, and dividing them by the representative COPs.

DOE created UECs for each of the 16 International Energy Conservation Code ("IECC") Climate Zones in the U.S. by simulating the small hotel prototype in one representative city for each climate zone. DOE used county level population data from the U.S. Census Bureau[20] along with a Pacific Northwest Laboratory report[21], which 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, California and the remaining states of Census Division 9 (Washington, Oregon, Hawaii, and Alaska). The resulting UECs represent the average small hotel guestroom cooling and heating energy use for each Census Division (with Census Division 9 split into two regions as explained previously).

DOE made further adjustments to each UEC for each climate zone to better account for the field energy use of PTACs and PTHPs. The Energy Information Administration's ("EIA") National Energy Modeling System ("NEMS"), which is used to

[20] Available at: *www.census.gov/data/datasets/time-series/demo/popest/2010s-counties-total.html#par_textimage_70769902.*
[21] Available at: *www.energy.gov/sites/prod/files/2015/10/f27/ba_climate_region_guide_7.3.pdf.*

develop the Annual Energy Outlook ("AEO"), develops a time series of scaling factors that capture the improvements of building envelopes in new and existing buildings over time.[22] These building shell scalars are multiplied by the UEC to demonstrate the reduction in cooling and heating energy use by improved building envelopes by census division and building type between the year of construction of the small hotel commercial reference building (2004) and the compliance year (2026). DOE applied the scalars for the lodging building type to the UECs developed using the cooling and heating loads from the small hotel commercial reference building. DOE calculated the improvement between 2004, the year of the small hotel reference building, and 2026, the compliance year, using the new construction time series to create a new construction UEC and the existing building time series to create an existing building UEC in 2026. DOE weighted the results using shipments projections to new construction (12 percent) and existing buildings (88 percent) to create a weighted average UEC in 2026.

DOE received no comments on the energy use analysis in the NOPD, and maintains this analysis for the final determination.

Chapter 7 of the final determination TSD provides details on DOE's energy use analysis for PTACs and PTHPs.

[22] Available at: *www.eia.gov/analysis/studies/buildings/buildingshell/*.

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 PTACs and PTHPs. 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 use, maintenance, and repair). To compute the operating costs, DOE discounts future operating costs to the time of purchase 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 PTACs and PTHPs 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.

For each considered efficiency level in each product class, DOE calculated the LCC and PBP for PTACs and PTHPs used in small hotel guestrooms. As stated previously, DOE developed a sample of small hotel guestroom PTAC and PTHP UECs by census division based on the DOE small hotel reference building. For each census division, DOE determined the average energy consumption for a PTAC or PTHP in a small hotel guestroom and the appropriate electricity price. By developing a sample of UECs by census division, the analysis captured the variability in energy consumption and energy prices associated with the use of PTACs and PTHPs.

Inputs to the calculation of total installed cost include the cost of the product—which includes MPCs, manufacturer markups, retailer and distributor 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, product lifetimes, and discount rates. 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 used 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 PTAC and PTHP user samples. The model calculated the LCC and PBP for products 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 PTAC or PTHP owner, product efficiency is chosen based on its probability. If the chosen product efficiency is greater than or equal to the efficiency of the standard level under consideration, the LCC and PBP calculation reveals that the PTAC or PTHP owner is not impacted by the standard level. By accounting for PTAC or PTHP owners who already purchase more-efficient products, DOE avoids overstating the potential benefits from increasing product efficiency.

DOE calculated the LCC and PBP for all consumers of PTACs and PTHPs as if each were to purchase a new product in the expected year of required compliance with new or amended standards. Any amended standards would apply to PTACs and PTHPs manufactured 3 years after the date on which any new or amended standard is published. (42 U.S.C. 6313(a)(6)(C)(iv)(I)) For purposes of its analysis, DOE used 2026 as the first year of compliance with any amended standards for PTACs and PTHPs.

Table IV-15 summarizes the approach and data DOE used to derive inputs to the LCC and PBP calculations for the NOPD analysis. *See* 87 FR 37934, 37956-37957. DOE received no comments on its LCC and PBP analysis in response to the NOPD, and has maintained the same methodology in this final determination. The subsections that follow provide further discussion. Details of the spreadsheet model, and of all the inputs to the LCC and PBP analyses, are contained in chapter 8 of the final determination TSD and its appendices.

Table IV.10. Summary of Inputs and Methods for the LCC and PBP Analysis*

Inputs	Source/Method
Product Cost	Derived by multiplying MPCs by manufacturer, contractor, and distributor markups and sales tax, as appropriate. A constant price trend was used to project product costs.
Installation Costs	Baseline installation cost determined with data from RS Means for the 2015 final rule, updated to 2021 dollars. Assumed no change with efficiency level.
Annual Energy Use	The total full-load cooling and heating hours multiplied by the full load cooling and heating power at each efficiency level. Variability: Based on the 16 IECC climate zones and representative cities from the DOE commercial reference building then mapped to census divisions (with census division 9 split into California and the rest of the census division).
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. The materials portion of repair costs changes by efficiency level; the labor costs are constant and based on RS Means. Values from 2015 final rule were converted to 2021 dollars.
Product Lifetime	Average: 8 years
Discount Rates	Commercial Discount rates for lodging, healthcare, and small office. The approach involves estimating the cost of capital of companies that purchase PTAC and PTHP equipment
Compliance Date	2026

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

1. PTAC and PTHP Equipment Cost

To calculate consumer PTAC and PTHP 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 products and higher-efficiency products because DOE applies an incremental markup to the increase in MSP associated with higher-efficiency products.

DOE used a constant trend to project equipment prices between 2021 (the year for which MPCs were developed) and 2026. The constant trend is based on a historical time series of the deflated PPI for all other miscellaneous refrigeration and air conditioning

equipment between 1990 and 2021.[23] The deflated PPI does not indicate a long term upward or downward trend, therefore DOE used a constant price trend for PTACs and PTHPs. *See* 87 FR 37934, 37957.

2. Installation Cost

Installation cost includes labor, overhead, and any miscellaneous materials and parts needed to install the product. DOE used the installation costs developed from the 2015 final rule[24] and converted them to 2021 dollars using the GDP implicit price deflator[25] to estimate the labor costs associated with baseline installation cost for PTACs and PTHPs. As representative efficiency levels for PTACs and PTHPs in this analysis are single-stage, packaged units that fit into a wall sleeve, DOE found no evidence that installation costs would be impacted with increased efficiency levels.

3. Annual Energy Consumption

For each census division, DOE determined the energy consumption for a PTAC or PTHP in a small hotel guestroom at different efficiency levels using the approach described previously in section IV.E of this document.

4. Energy Prices

Because marginal electricity price more accurately captures the incremental savings associated with a change in energy use from higher efficiency, it provides a better

[23] Available at: *https://www.bls.gov/ppi/*
[24] See Chapter 8 of the 2015 Final Rule Technical Support Documents (Available at: *https://www.regulations.gov/document/EERE-2012-BT-STD-0029-0040*).
[25] *https://fred.stlouisfed.org/series/GDPDEF.*

representation of incremental change in consumer costs than average electricity prices. Therefore, DOE applied average electricity prices for the energy use of the product 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.[26] 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. For the commercial sector, DOE calculated electricity prices using the methodology described in Coughlin and Beraki (2019).[27]

DOE's methodology allows electricity prices to vary by sector, region, and season. In the analysis, variability in electricity prices is chosen to be consistent with the way the consumer economic and energy use characteristics are defined in the LCC analysis. For PTACs and PTHPs, DOE developed UECs by census division for each equipment class and efficiency level for the summer (May to September) and winter (October to April) seasons. The average summer and winter electricity price for large commercial buildings was used to measure the baseline energy cost. The summer and winter marginal prices for large commercial buildings, using a marginal load factor of 0.5

[26] Available at: *https://netforum.eei.org/eweb/DynamicPage.aspx?WebCode=COEPubSearch&pager=12*
[27] 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. *ees.lbl.gov/publications/non-residential-electricity-prices.*

were used to measure the operating cost savings from higher efficiency PTACs and PTHPs. See chapter 8 of the final determination 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.[28] To estimate price trends after 2050, DOE kept the energy price constant at the 2050 value.

5. Maintenance and Repair Costs

Repair costs are associated with repairing or replacing PTAC and PTHP components that have failed in an appliance; maintenance costs are associated with maintaining the operation of the PTAC or PTHP. Typically, small incremental increases in product efficiency produce no changes in maintenance costs compared to baseline efficiency products. Repair costs consist of the cost of labor to perform the repair as well as the cost of materials to replace the component that has failed. DOE assumes that the labor costs stay constant and the material costs will increase proportionally with the incremental increase of the MPC. In the July 2015 final rule, DOE used the material and labor costs associated with repair of equipment components covered and not covered by a standard manufacturer warranty. *See* 80 FR 43162, 43180. Based on a report of component failure probability and warranty terms, and on component material and labor costs from RS Means data,[29] DOE determined the expected value of the total cost of a

[28] EIA. *Annual Energy Outlook 2022 with Projections to 2050.* Washington, DC. Available at *www.eia.gov/forecasts/aeo/* (last accessed May 5, 2022).
[29] RS Means Company, Inc. ''RSMeans Facilities Maintenance & Repair Cost Data,'' 2013.

repair and annualized it to determine the annual repair cost. DOE scaled by cooling capacity and MSP to determine repair costs for the equipment classes and considered efficiency levels. *Id*. For this analysis, DOE updated the labor portion of the annualized repair cost using the GDP implicit price deflator[30] and updated the material portion of baseline products by the PPI for Air-conditioning, refrigeration, and forced air heating equipment manufacturing.[31] The material portion of the repair cost for higher efficiency components was scaled with the MSPs.

6. Product Lifetime

For PTACs and PTHPs, DOE used the same lifetime estimates from July 2015 final rule. *See* 80 FR 43162, 43180. DOE requested comment on this approach to equipment lifetime in the December 2020 ECS RFI. 85 FR 82952, 82963

The average lifetime is assumed to be eight years, and the distribution allows for a range of lifetimes up to 16 years. DOE's lifetime assumption with a mean of 8 years falls between the various stakeholder comments on the December 2020 ECS RFI and considering no additional data were identified to support a shorter or longer life, DOE maintained the same lifetime assumptions as in the July 2015 final rule.

7. Discount Rates

DOE's method views the purchase of a higher efficiency appliance as an investment that yields a stream of energy cost savings. DOE derived the discount rates

[30] *https://fred.stlouisfed.org/series/GDPDEF*
[31] *https://www.bls.gov/ppi/*

for the LCC analysis by estimating the cost of capital for companies or public entities that purchase PTACs and PTHPs. 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 PTACs and PTHPs.[32] 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 PTAC and PTHP equipment. DOE used the same types of companies that were used in the July 2015 final rule, large hotel/motel chains, independent hotel/motel, assisted living/health care, and small office. 80 FR 43162, 43181. More details regarding the DOE's estimates of discount rates can be found in Chapter 8 of the final determination 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 considered the projected distribution (market shares) of equipment efficiencies

[32] 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.

under the no-new-standards case (*i.e.*, the case without amended or new energy conservation standards).

To estimate the energy efficiency distribution of PTACs and PTHPs for 2026, DOE used model counts from CCD[33] and applied a growth rate of 1 EER every 35 years, which was used in the July 2015 final rule and is based on a growth trend in the absence of standards developed in the 2004 commercial unitary air conditioner advanced notice of proposed rulemaking ("2004 ANOPR").[34] 80 FR 43162, 43183. The estimated market shares for the no-new-standards case for PTACs and PTHPs are shown in Table IV-16. DOE notes that there are currently units in CCD that are at the baseline efficiency level, but given the small difference between the baseline and EL 1, the growth rate of 1 EER every 35 years leads to no products at the baseline in 2026. See chapter 8 of the final determination TSD for further information on the derivation of the efficiency distributions.

Table IV.11. Market Shares for the No-New-Standards Case

Equipment Type	Cooling Capacity	Market Share by EL					
		Baseline*	**EL1**	**EL2**	**EL3**	**EL4**	**EL5**
PTAC	9,000 Btu/h	0%	44%	29%	11%	6%	10%
	15,000 Btu/h	0%	0%	52%	34%	14%	0%
		Baseline*	**EL1**	**EL2**	**EL3**	**EL4**	**EL5**
PTHP	9,000 Btu/h	0%	44%	21%	16%	10%	9%
	15,000 Btu/h	0%	0%	41%	40%	20%	0%

[33] *www.regulations.doe.gov/certification-data/#q=Product_Group_s%3A** (last accessed: March 9, 2022)

[34] See Chapter 10 of DOE's technical support document underlying DOE's July 29, 2004 ANOPR. (Available at: *https://www.regulations.gov/document/EERE-2006-STD-0103-0078*).

9. Payback Period Analysis

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

The inputs to the PBP calculation for each efficiency level are the change in total installed cost of the PTACs and PTHPs and the change in the first-year annual operating expenditures relative to the baseline. The PBP calculation uses the same inputs as the LCC analysis, except that discount rates are not needed.

G. Shipments Analysis

DOE uses projections of annual shipments to calculate the national impacts of potential amended or new energy conservation standards on energy use, NPV, and future manufacturer cash flows.[35] The shipments model takes an accounting approach in tracking market shares of each equipment class and the vintage of units in the stock. Stock accounting uses product shipments as inputs to estimate the age distribution of in-service equipment stocks for all years. The age distribution of in-service equipment

[35] DOE uses data on manufacturer shipments as a proxy for national sales, as aggregate data on sales are lacking. In general, one would expect a close correspondence between shipments and sales.

stocks is a key input to calculations of both the NES and NPV, because operating costs for any year depend on the age distribution of the stock.

In the June 2022 NOPD, DOE developed shipment projections based on historical data and an analysis of key market drivers for this equipment. 87 FR 37934, 37959 (citing 80 FR 43162, 43182). Historical shipments were used to build up an equipment stock and also to calibrate the shipments model. DOE separately calculated shipments intended for new construction and replacement applications. The sum of new construction and replacement shipments was the total shipments. *Id.*

New construction shipments were calculated using projected floor space of healthcare, lodging, and small office buildings from *AEO 2022* and historical PTAC and PTHP saturation in new buildings, which was estimated by dividing historical new shipments by new construction floor space. Id. Replacement shipments were equal to the number of units that fail in a given year. The failures were based on a retirement function in the form of a Weibull distribution with inputs based on lifetime values from the LCC analysis to estimate the number of units of a given age that fail in each year. *Id.*

DOE received no comments on its shipments analysis in the NOPD and has maintained the same methodology for this final determination.

For further information on the shipments analysis, see chapter 9 of the final determination TSD.

H. National Impact Analysis

The NIA assesses the NES and the NPV from a national perspective of total consumer costs and savings that would be expected to result from new or amended standards at specific efficiency levels.[36] ("Consumer" in this context refers to consumers of the PTACs and PTHPs being regulated.) DOE calculates the NES and NPV for the potential standard levels considered based on projections of annual product shipments, along with the annual energy consumption and total installed cost data from the energy use and LCC analyses. For the present analysis, DOE projected the energy savings, operating cost savings, product costs, and NPV of consumer benefits over the lifetime of PTACs and PTHPs sold from 2026 through 2055.

DOE evaluates the effects of new or amended standards by comparing a case without such standards with standards-case projections. The no-new-standards case characterizes energy use and consumer costs for each PTAC and PTHP class in the absence of new or amended energy conservation standards. For this projection, DOE considers historical trends in efficiency and various forces that are likely to affect the mix of efficiencies over time. DOE compares the no-new-standards case with projections characterizing the market for each PTAC and PTHP class if DOE adopted new or amended standards at specific energy efficiency levels (*i.e.*, the ELs or standards cases) for that class. For the standards cases, DOE considers how a given standard would likely affect the market shares of PTACs and PTHPs with efficiencies greater than the standard.

[36] The NIA accounts for impacts in the 50 states and Washington D.C.

DOE uses a spreadsheet model to calculate the energy savings and the national consumer costs and savings from each EL. Interested parties can review DOE's analyses by changing various input quantities within the spreadsheet. The NIA spreadsheet model uses typical values (as opposed to probability distributions) as inputs.

Table IV-17 summarizes the inputs and methods DOE used for the NIA analysis for the NOPD. *See* 87 FR 37934, 37960-61. DOE received no comments in response to its analysis, and maintains the same inputs and methods in this final determination. Discussion of these inputs and methods follows the table. See chapter 10 of the final determination TSD for details.

Table IV.12. Summary of Inputs and Methods for the National Impact Analysis

Inputs	Method
Shipments	Annual shipments from shipments model.
Modeled Compliance Date of Standard	2026
Efficiency Trends	No-new-standards case – 1 EER every 35 years Standards cases – 1 EER every 35 years
Annual Energy Consumption per Unit	Annual weighted-average values are a function of energy use at each EL.
Total Installed Cost per Unit	Annual weighted-average values are a function of cost at each EL. Future product prices are constant.
Annual Energy Cost per Unit	Annual weighted-average values as a function of the annual energy consumption per unit and energy prices.
Repair and Maintenance Cost per Unit	The materials portion of annual repair costs scale with MPCs, maintenance costs do not change by EL.
Energy Prices	*AEO 2022* projections (to 2050) and constant 2050 value through 2075.
Energy Site-to-Primary and FFC Conversion	A time-series conversion factor based on *AEO 2022*.
Discount Rate	3 percent and 7 percent
Present Year	2021

1. Equipment Efficiency Trends

A key component of the NIA is the trend in energy efficiency projected for the no-new-standards case and each of the standards cases. Section IV.E.8 of this document describes how DOE developed an energy efficiency distribution for the no-new-standards case (which yields a shipment-weighted average efficiency) for each of the considered product classes for the year of anticipated compliance with an amended or new standard.

For the standards cases, DOE used a "roll-up" scenario to establish the shipment-weighted efficiency for the year that standards are assumed to become effective (2026). In this scenario, the market shares of products in the no-new-standards case that do not meet the standard under consideration would "roll up" to meet the new standard level, and the market share of products above the standard would remain unchanged.

To develop no-new-standards case and standards case efficiency trends after 2026, DOE used the same approach as in the July 2015 final rule, which grows the efficiency trend at a rate of 1 EER every 35 years for all product classes. 80 FR 43162, 43183.

2. National Energy Savings

The NES analysis involves a comparison of national energy consumption of the considered products between each potential standards case (EL) and the case with no new or amended energy conservation standards. DOE calculated the national energy consumption by multiplying the number of units (stock) of each product (by vintage or age) by the unit energy consumption (also by vintage). DOE calculated annual NES

based on the difference in national energy consumption for the no-new-standards case and for each higher efficiency standard case. DOE estimated energy consumption and savings based on site energy and converted the electricity consumption and savings to primary energy (*i.e.*, the energy consumed by power plants to generate site electricity) using annual conversion factors derived from *AEO 2022*. Cumulative energy savings are the sum of the NES for each year over the timeframe of the analysis.

Use of higher-efficiency products is occasionally associated with a direct rebound effect, which refers to an increase in utilization of the product due to the increase in efficiency. For PTAC/PTHP, DOE did not consider any rebound as the entities using the equipment are typically not the ones paying the energy costs.

In 2011, in response to the recommendations of a committee on "Point-of-Use and Full-Fuel-Cycle Measurement Approaches to Energy Efficiency Standards" appointed by the National Academy of Sciences, DOE announced its intention to use FFC measures of energy use and greenhouse gas and other emissions in the NIA and emissions analyses included in future energy conservation standards rulemakings. 76 FR 51281 (Aug. 18, 2011). After evaluating the approaches discussed in the August 18, 2011 notice, DOE published a statement of amended policy in which DOE explained its determination that EIA's National Energy Modeling System ("NEMS") is the most appropriate tool for its FFC analysis and its intention to use NEMS for that purpose. 77 FR 49701 (Aug. 17, 2012). NEMS is a public domain, multi-sector, partial

equilibrium model of the U.S. energy sector[37] that EIA uses to prepare its AEO. The FFC factors incorporate losses in production, and delivery in the case of natural gas, (including fugitive emissions) and additional energy used to produce and deliver the various fuels used by power plants. The approach used for deriving FFC measures of energy use and emissions is described in appendix 10B of the final determination TSD.

3. Net Present Value Analysis

The inputs for determining the NPV of the total costs and benefits experienced by consumers are: (1) total annual installed cost, (2) total annual operating costs (energy costs and repair and maintenance costs), and (3) a discount factor to calculate the present value of costs and savings. DOE calculates net savings each year as the difference between the no-new-standards case and each standards case in terms of total savings in operating costs versus total increases in installed costs. DOE calculates operating cost savings over the lifetime of each product shipped during the projection period.

As discussed in section IV.E.1 of this document, DOE assumed a constant price trend for PTACs and PTHPs. DOE applied the same constant price trend to project prices for each PTAC and PTHP class at each considered efficiency level.

The operating cost savings are energy cost savings, which are calculated using the estimated energy savings in each year and the projected price of the appropriate form of energy, and repair costs, which remain constant through the analysis period. To estimate

[37] For more information on NEMS, refer to *The National Energy Modeling System: An Overview 2009*, DOE/EIA-0581(2009), October 2009. Available at *www.eia.gov/analysis/pdfpages/0581(2009)index.php* (last accessed 4/15/2022).

energy prices in future years, DOE multiplied the average regional energy prices by the projection of annual national-average commercial electricity price changes in the Reference case from *AEO 2022*, which has an end year of 2050. To estimate price trends after 2050, DOE kept the 2050 value constant through 2075.

In calculating the NPV, DOE multiplies the net savings in future years by a discount factor to determine their present value. For this NOPD, DOE estimated the NPV of consumer benefits using both a 3-percent and a 7-percent real discount rate. DOE uses these discount rates in accordance with guidance provided by the Office of Management and Budget ("OMB") to Federal agencies on the development of regulatory analysis.[38] The discount rates for the determination of NPV are in contrast to the discount rates used in the LCC analysis, which are designed to reflect a consumer's perspective. The 7-percent real value is an estimate of the average before-tax rate of return to private capital in the U.S. economy. The 3-percent real value represents the "social rate of time preference," which is the rate at which society discounts future consumption flows to their present value.

V. Analytical Results and Conclusions

The following section addresses the results from DOE's analyses with respect to the considered energy conservation standards for PTACs and PTHPs. It addresses the ELs examined by DOE and the projected impacts of each of these levels. Additional

[38] United States Office of Management and Budget. *Circular A-4: Regulatory Analysis.* September 17, 2003. Section E. Available at *https://www.federalregister.gov/documents/2003/10/09/03-25606/circular-a-4-regulatory-analysis* (last accessed April 15, 2022).

details regarding DOE's analyses are contained in the final determination TSD supporting this document.

A. Economic Impacts on PTAC and PTHP Consumers

DOE analyzed the cost effectiveness (*i.e.,* the savings in operating costs throughout the estimated average life of PTACs and PTHPs) compared to any increase in the price of, or in the initial charges for, or maintenance expenses of, the PTACs and PTHPs, which are likely to result from the imposition of a standard at an EL by considering the LCC and PBP at each EL. These analyses are discussed in the following sections.

In general, higher-efficiency products affect consumers in two ways: (1) purchase price increases and (2) annual operating costs decrease. Inputs used for calculating the LCC and PBP include total installed costs (*i.e.*, product price plus installation costs), and operating costs (*i.e*., 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 final determination TSD provides detailed information on the LCC and PBP analyses.

Table V-1 through Table V-4 show the LCC and PBP results for the ELs considered in this analysis. The simple payback is measured relative to the efficiency distribution in the no-new-standards case in the compliance year (see section IV.E.8 of this document). Because some consumers purchase products with higher efficiency in the no-new-standards case, the average savings are less than the difference between the

average LCC of the baseline product and the average LCC at each EL. The 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 at a given EL experience a net cost.

Table V.1. Average LCC and PBP Results by Efficiency Level for Standard Size PTACs with a Cooling Capacity of 9,000 Btu/h

Efficiency Level	LCC Savings *2021$*	Simple Payback Period *years*
EL 1	$0.00	N/A
EL 2	$1.92	5.6
EL 3	-$0.47	6.0
EL 4	-$5.60	6.5
EL 5	-$8.70	6.8

Table V.2. Average LCC and PBP Results by Efficiency Level for Standard Size PTACs with a Cooling Capacity of 15,000 Btu/h

Efficiency Level	LCC Savings *2021$*	Simple Payback Period *years*
EL 1	$0.00	N/A
EL 2	$0.00	N/A
EL 3	$6.39	4.1
EL 4	-$1.77	4.9
EL 5	-$8.68	5.3

Table V.3. Average LCC and PBP Results by Efficiency Level for Standard Size PTHPs with a Cooling Capacity of 9,000 Btu/h

Efficiency Level	LCC Savings *2021$*	Simple Payback Period *years*
EL 1	$0.00	N/A
EL 2	$2.42	5.3
EL 3	$0.72	5.7
EL 4	-$3.75	6.2
EL 5	-$6.48	6.4

Table V.4. Average LCC and PBP Results by Efficiency Level for Standard Size PTHPs with a Cooling Capacity of 15,000 Btu/h

Efficiency Level	LCC Savings *2021$*	Simple Payback Period *years*
EL 1	$0.00	N/A
EL 2	$0.00	N/A
EL 3	$7.27	4.0
EL 4	-$0.66	4.7
EL 5	-$7.07	5.1

B. National Impact Analysis

This section presents DOE's estimates of the NES and the NPV of consumer benefits that would result from each of the ELs considered as potential amended standards.

1. Significance of Energy Savings

To estimate the energy savings attributable to potential amended standards for PTACs and PTHPs, DOE compared their energy consumption under the no-new-standards case to their anticipated energy consumption under each EL. The savings are

measured over the entire lifetime of products purchased in the 30-year period that begins in the year of anticipated compliance with amended standards (2026–2055). Table V-5 presents DOE's projections of the NES for each EL considered for PTACs and PTHPs. The savings were calculated using the approach described in section IV.G of this document.

Table V.5. Cumulative National Energy Savings for PTACs and PTHPs; 30 Years of Shipments (2026-2055)

	Efficiency Level				
	1	2	3	4	5
	quads				
Primary energy	0.000	0.002	0.014	0.045	0.068
FFC energy	0.000	0.002	0.015	0.047	0.071

OMB Circular A-4[39] requires agencies to present analytical results, including separate schedules of the monetized benefits and costs that show the type and timing of benefits and costs. Circular A-4 also directs agencies to consider the variability of key elements underlying the estimates of benefits and costs. For this final determination, DOE undertook a sensitivity analysis using 9 years, rather than 30 years, of product shipments. The choice of a 9-year period is a proxy for the timeline in EPCA for the review of certain energy conservation standards and potential revision of and compliance with such revised standards.[40] The review timeframe established in EPCA is

[39] U.S. Office of Management and Budget. *Circular A-4: Regulatory Analysis*. September 17, 2003. Available at *obamawhitehouse.archives.gov/omb/circulars_a004_a-4/* (last accessed April 15, 2022).
[40] For ASHRAE products, section 342(a)(6)(C) of EPCA requires DOE to review its standards every 6 years, and requires, for certain products, a 3-year period after any new standard is promulgated before compliance is required, except that in no case may any new standards be required within 6 years of the compliance date of the previous standards. If DOE makes a determination that amended standards are not needed, it must conduct a subsequent review within three years following such a determination. As DOE is evaluating the need to amend the standards, the sensitivity analysis is based on the review timeframe

generally not synchronized with the product lifetime, product manufacturing cycles, or other factors specific to PTACs and PTHPs. Thus, such results are presented for informational purposes only and are not indicative of any change in DOE's analytical methodology. The NES sensitivity analysis results based on a 9-year analytical period are presented in Table V-6. The impacts are counted over the lifetime of PTACs and PTHPs purchased in 2026 to 2034.

Table V.6. Cumulative National Energy Savings for PTACs and PTHPs; 9 Years of Shipments (2026-2034)

	Efficiency Level				
	1	2	3	4	5
	quads				
Primary energy	0.000	0.002	0.011	0.023	0.029
FFC energy	0.000	0.002	0.011	0.023	0.030

a. Net Present Value of Consumer Costs and Benefits

DOE estimated the cumulative NPV of the total costs and savings for consumers that would result from an amended standard at each of the representative ELs considered for PTACs and PTHPs. In accordance with OMB's guidelines on regulatory analysis,[41] DOE calculated NPV using both a 7-percent and a 3-percent real discount rate.

associated with amended standards. While adding a 6-year review to the 3-year compliance period adds up to 9 years, DOE notes that it may undertake reviews at any time within the 6-year period and that the 3-year compliance date may yield to the 6-year backstop. A 9-year analysis period may not be appropriate given the variability that occurs in the timing of standards reviews and the fact that for some products, the compliance period is 6 years rather than 3 years.

[41] U.S. Office of Management and Budget. *Circular A-4: Regulatory Analysis*. September 17, 2003. Available at *obamawhitehouse.archives.gov/omb/circulars_a004_a-4/* (last accessed April 15, 2022).

Table V-7 shows the consumer NPV results with impacts counted over the lifetime of products purchased in 2026–2055.

Table V.7. Cumulative Net Present Value of Consumer Benefits for PTACs and PTHPs; 30 Years of Shipments (2026–2055)

Discount Rate	Trial Standard Level				
	1	2	3	4	5
	billion 2021$				
3 percent	0.000	-0.004	-0.043	-0.167	-0.268
7 percent	0.000	-0.004	-0.035	-0.116	-0.174

The NPV results based on the aforementioned 9-year analytical period are presented in Table V-8. The impacts are counted over the lifetime of PTACs and PTHPs purchased in 2026–2034. As mentioned previously, such results are presented for informational purposes only and are not indicative of any change in DOE's analytical methodology or decision criteria.

Table V.8. Cumulative Net Present Value of Consumer Benefits for PTACs and PTHPs ; 9 Years of Shipments (2026–2034)

Discount Rate	Trial Standard Level				
	1	2	3	4	5
	billion 2021$				
3 percent	0.000	-0.004	-0.033	-0.088	-0.124
7 percent	0.000	-0.004	-0.029	-0.073	-0.102

C. Final Determination

EPCA specifies that for any commercial and industrial equipment addressed under 42 U.S.C. 6313(a)(6)(A)(i), including PTACs and PTHPS, 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.

Because an analysis of potential cost-effectiveness and energy savings first require an evaluation of the relevant technology, DOE first discusses the technological feasibility of amended standards. DOE then evaluates the energy savings potential and cost-effectiveness of potential amended standards.

1. Technological Feasibility

EPCA mandates that DOE consider whether amended energy conservation standards for PTACs and PTHPs would be technologically feasible. (42 U.S.C. 6313(a)(6)(A)(ii)(II))

DOE considers technologies incorporated in commercially available products or in working prototypes and improve efficiency to be technologically feasible. Per the technology options discussed in section IV.B.3of this document and the screened-in technologies in section IV.B.4 , DOE has determined, based on clear and convincing evidence, that amended energy conservation standards for PTACs and PTHPs would be technologically feasible.

2. Significant Conservation of Energy

EPCA also mandates that DOE consider whether amended energy conservation standards for PTACs and PTHPS would result in result in significant additional conservation of energy. (42 U.S.C. 6313(a)(6)(A)(ii)(II))

In the present case, DOE estimates that amended standards for PTACs and PTHPs would result in energy savings of 0.002 quads at EL 2, 0.013 quads at EL 3, 0.014 quads at EL 4, and 0.062 quads at EL 5 (the max-tech level) over a 30-year analysis period (2026-2055). However, as discussed in the following section DOE lacks the clear and convincing evidence necessary to determine that amended standards for PTACs and PTHPs would be economically justified.

3. Economic Justification

In determining whether a standard is economically justified, the Secretary must determine whether the benefits of the standard exceed its burdens, considering to the greatest extent practicable the seven statutory factors discussed previously (see 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, as well as the NPV.

DOE conducted an LCC analysis to estimate the net costs/benefits to users from increased efficiency in the considered PTACs and PTHPs (See results in Table V-1 to Table V-4). DOE then aggregated the results from the LCC analysis to estimate the NPV of the total costs and benefits experienced by the Nation (See results in Table V-7 and Table V-8). As noted, the inputs for determining the NPV are: (1) total annual installed cost, (2) total annual operating costs (energy costs and repair and maintenance costs), and (3) a discount factor to calculate the present value of costs and savings. A summary of the analytical results can be found in Table V-9.

Table V.9. Summary of Analytical Results of PTAC and PTHP Equipment

Category	**EL1**	**EL 2**	**EL 3**	**EL 4**	**EL 5**
Cumulative National FFC Energy Savings quads					
	0.000	0.002	0.015	0.047	0.071
NPV of Consumer Costs and Benefits* ** 2021$ billion					
3% discount rate	0.000	-0.004	-0.043	-0.167	-0.268
7% discount rate	0.000	-0.004	-0.035	-0.116	-0.174
Consumer Mean LCC Savings 2021$					
Standard Size PTACs – 9,000 Btu/h	0.00	1.92	-0.47	-5.60	-8.70
Standard Size PTACs – 15,000 Btu/h	0.00	0.00	6.39	-1.77	-8.68
Standard Size PTHPs – 9,000 Btu/h	0.00	2.42	0.72	-3.75	-6.48
Standard Size PTHPs – 15,000 Btu/h	0.00	0.00	7.27	-0.66	-7.07
Consumer Mean Payback Period					

Standard Size PTACs – 9,000 Btu/h	N/A	5.6	6.0	6.5	6.8
Standard Size PTACs – 15,000 Btu/h	N/A	N/A	4.1	4.9	5.3
Standard Size PTHPs – 9,000 Btu/h	N/A	5.3	5.7	6.2	6.4
Standard Size PTHPs – 15,000 Btu/h	N/A	N/A	4.0	4.7	5.1

DOE estimates that amended standards for PTACs and PTHPs would result in NPV of $0.000 at EL 1, of -$0.004 billion at a 3 percent discount rate and -$0.004 billion at a 7 percent discount rate at EL 2, of -$0.043 billion at a 3 percent discount rate and -$0.035 billion at a 7 percent discount rate at EL 3, of -$0.167 billion at a 3 percent discount rate and -$0.116 billion at a 7 percent discount rate at EL 4, and of -$0.268 billion at a 3 percent discount rate and -$0.174 billion at a 7 percent discount rate at EL 5. Because the NPV values are negative and indicate no economic benefit, DOE has determined that it lacks clear and convincing evidence that amended energy conservation standards would be economically justified.

4. Summary

Based on the NPV being zero at EL 1 and negative at each higher EL, DOE has determined that the energy conservation standards for PTACs and PTHP do not need to be amended, having determined that it lacks “clear and convincing” evidence that amended standards would be economically justified.

VI. Procedural Issues and Regulatory Review

A. Review Under Executive Order 12866 and 13563

Executive Order ("E.O.") 12866, "Regulatory Planning and Review," 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 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 final 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 that by law must be proposed 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 E.O. 13272, "Proper Consideration of Small Entities in Agency Rulemaking," 67 FR 53461 (Aug. 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 rulemaking process. 68 FR 7990. DOE has made its procedures and policies available on the Office of the General Counsel's website (www.*energy.gov/gc/office-general-counsel*).

DOE reviewed this final determination under the provisions of the Regulatory Flexibility Act and the policies and procedures published on February 19, 2003. Because DOE is not amending standards for PTACs and PTHPs this determination would not

amend any energy conservation standards. On the basis of the foregoing, DOE certifies that the determination, will have no significant economic impact on a substantial number of small entities. Accordingly, DOE has not prepared an IRFA or a final regulatory flexibility analysis for this determination. DOE has transmitted this 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).

C. Review Under the Paperwork Reduction Act

This final determination, which determines that amended energy conservation standards for PTACs and PTHPs are unneeded under the applicable statutory criteria, imposes no new informational or recordkeeping requirements. Accordingly, OMB clearance is not required under the Paperwork Reduction Act. (44 U.S.C. 3501 *et seq*.)

D. Review Under the National Environmental Policy Act of 1969

DOE has analyzed this action in accordance with the National Environmental Policy Act of 1969 ("NEPA") and DOE's NEPA implementing regulations (10 CFR part 1021). DOE's regulations include a categorical exclusion for actions which are interpretations or rulings with respect to existing regulations. 10 CFR part 1021, subpart D, appendix A4. DOE anticipates that this action qualifies for categorical exclusion A4 because it is an interpretation or ruling in regard to an existing regulation and otherwise meets the requirements for application of a categorical exclusion. *See* 10 CFR 1021.410. DOE has completed its NEPA review before issuing the final action.

E. Review Under Executive Order 13132

E.O. 13132, "Federalism," 64 FR 43255 (Aug. 10, 1999), imposes certain requirements on Federal agencies formulating and implementing policies or regulations that preempt State law or that have federalism implications. The E.O. 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 E.O. 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 final determination and has 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 final 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 (b); 42 U.S.C. 6297) As this final determination would not amend the standards for PTAC and PTHPs, there is no impact on the policymaking discretion of the States. Therefore, no further action is required by E.O. 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," 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. 61 FR 4729 (Feb. 7, 1996). 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 E.O. 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 final 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. Pub. L. 104-4, sec. 201 (codified at 2 U.S.C. 1531). For a 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 www.*energy.gov/sites/prod/files/gcprod/documents/umra_97.pdf*.

DOE examined this final determination according to UMRA and its statement of policy and determined that this final determination does not contain a Federal intergovernmental mandate, nor is it expected to require expenditures of $100 million or more in any one year by State, local, and Tribal governments, in the aggregate, or by the private sector. 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 determination 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 (Mar. 15, 1988), DOE has determined that this 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 final 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 the OIRA at OMB, a Statement of Energy Effects for any

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 E.O. 12866, or any successor E.O.; 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 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.

This final determination, which does not amend energy conservation standards for PTACs and PTHPs, 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 on this final determination.

L. Information Quality

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." *Id.* at 70 FR 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.[42] 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.[43]

[42] 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* (last accessed Jan 3, 2023).
[43] The December 2021 NAS report is available at *www.nationalacademies.org/our-work/review-of-methods-for-setting-building-and-equipment-performance-standards.*

M. Congressional Notification

As required by 5 U.S.C. 801, DOE will report to Congress on the promulgation of this determination prior to its effective date. The report will state that it has been determined that the determination is not a "major rule" as defined by 5 U.S.C. 804(2).

VII. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this final determination.

Signing Authority

This document of the Department of Energy was signed on February 3, 2023, 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 February 3, 2023

X FRANCISCO MORENO

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Francisco Alejandro Moreno
Acting Assistant Secretary for Energy Efficiency and Renewable Energy
U.S. Department of Energy