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DEPARTMENT OF ENERGY

10 CFR Part 431

[EERE-2017-BT-STD-0009]

RIN 1905-AD79

Energy Conservation Program: Energy Conservation Standards for Walk-in Coolers and Freezers

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

ACTION: Notification of data availability regarding energy conservation standards.

SUMMARY: On September 5, 2023, the U.S. Department of Energy ("DOE") published a notice of proposed rulemaking ("NOPR"), in which DOE proposed amended energy conservation standards for walk-in coolers and walk-in freezers. ("September 2023 NOPR") In this notification, DOE is summarizing and addressing comments that were considered but not discussed in the September 2023 NOPR.

DATES: *Comments*: DOE will accept comments, data, and information regarding the September 2023 NOPR as supplemented by this notice of data availability no later than November 6, 2023.

Meeting: DOE is holding a public meeting regarding the September 2023 NOPR via webinar on Wednesday, September 27, 2023, from 1:00 p.m. to 4:00 p.m. See section IV, "Public Participation," for webinar registration information, participant instructions and information about the capabilities available to webinar participants.

ADDRESSES: Interested persons are encouraged to submit comments regarding the September 2023 NOPR as supplemented by this notice of data availability using the Federal eRulemaking Portal at *www.regulations.gov* under docket number EERE–2017–BT–STD-0009. Follow the instructions for submitting comments. Alternatively, interested persons may submit comments, identified by docket number EERE-2017-BT-STD-0009, by any of the following methods:

Email: *WICF2017STD0009@ee.doe.gov*. Include the docket number EERE-2017-BT-STD-0009 in the subject line of the message.

Non-electronic submissions: Please contact (202) 287–1445 for instructions if an electronic copy cannot be submitted.

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

Docket: The docket for this activity, which includes *Federal Register* notices, comments, and other supporting documents/materials, is available for review at *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 webpage can be found at *www.regulations.gov/docket/EERE-2017-BT-STD-0009*. The docket webpage contains instructions on how to access all documents, including public comments, in the docket. See section IV of this document for information on how to submit comments through *www.regulations.gov*.

FOR FURTHER INFORMATION CONTACT:

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

SUPPLEMENTARY INFORMATION:

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I. Background

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 of EPCA,[2] established the Energy Conservation Program for Certain Industrial Equipment. (42 U.S.C. 6311-6317) Such equipment includes walk-in coolers and walk-in freezers[3] (hereafter referred to as "walk-ins" or "WICFs"), the subject of this notification.

The current energy conservation standards for walk-ins are set forth in DOE's regulations at 10 CFR 431.306. Rather than establishing standards for complete walk-in systems, DOE has established standards for the principal components that make up a walk-in (i.e., doors, panels, and refrigeration systems). The current energy conservation standards for walk-in doors are in terms of maximum daily energy consumption, which is measured in kWh/day (see Table I.1). The current energy conservation standards for walk-in panels are in terms of R-value, which is measured in h-ft^2-°F/Btu (see Table I.2). The current energy conservation standards for refrigeration systems are in terms of annual walk-in energy factor ("AWEF"), which is measured in Btu/(W-h) (see Table I.3).

Table I.1 Federal Energy Conservation Standards for Walk-in Coolers and Walk-in Freezer Doors

Equipment class	Equations for Maximum Daily Energy Consumption (kWh/day)
Display door, medium-temperature	$0.04 \times A_{dd} + 0.41$
Display door, low-temperature	$0.15 \times A_{dd} + 0.29$
Passage door, medium-temperature	$0.05 \times A_{nd} + 1.7$
Passage door, low-temperature	$0.14 \times A_{nd} + 4.8$

[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 re-designated Part A-1.
[3] Walk-in coolers and walk-in freezers are defined as an enclosed storage space, including but not limited to panels, doors, and refrigeration systems, refrigerated to temperatures, respectively, above, and at or below 32 degrees Fahrenheit that can be walked into, and has a total chilled storage area of less than 3,000 square feet; however, the terms do not include products designed and marketed exclusively for medical, scientific, or research purposes. 10 CFR 431.302.

Freight door, medium-temperature	$0.04 \times A_{nd} + 1.9$
Freight door, low-temperature	$0.12 \times A_{nd} + 5.6$
A_{dd} or A_{nd} = surface area of the display door or non-display door, respectively, expressed in ft^2, as determined in appendix A to subpart R of 10 CFR part 431.	

Table I.2 Federal Energy Conservation Standards for Walk-in Coolers and Walk-in Freezer Panels

Equipment class	**Minimum R-value ($h\text{-}ft^2\text{-}°F/Btu$)**
Wall or ceiling panels, medium-temperature	25
Wall or ceiling panels, low-temperature	32
Floor panels, low-temperature	28

Table I.3 Federal Energy Conservation Standards for Walk-in Coolers and Walk-in Freezer Refrigeration Systems

Equipment class	**Minimum AWEF (Btu/W-h)**
Dedicated condensing system, medium-temperature, indoor	5.61
Dedicated condensing system, medium-temperature, outdoor	7.60
Dedicated condensing system, low-temperature, indoor with a net capacity (q_{net}) of < 6,500 British thermal units per hour ("Btu/h")	$9.091 \times 10^{-5} \times q_{net} + 1.81$
Dedicated condensing system, low-temperature, indoor with a net capacity (q_{net}) of ≥ 6,500 Btu/h	2.40
Dedicated condensing system, low-temperature, outdoor with a net capacity (q_{net}) of < 6,500 Btu/h	$6.522 \times 10^{-5} \times q_{net} + 2.73$
Dedicated condensing system, low-temperature, outdoor with a net capacity (q_{net}) of ≥ 6,500 Btu/h	3.15
Unit cooler, medium-temperature	9.00
Unit cooler, low-temperature, indoor with a net capacity (q_{net}) of < 15,500 Btu/h	$1.575 \times 10^{-5} \times q_{net} + 3.91$
Unit cooler, low-temperature, indoor with a net capacity (q_{net}) of ≥ 15,500 Btu/h	4.15
Where q_{net} is net capacity as determined in accordance with 10 CFR 431.304 and certified in accordance with 10 CFR part 429.	

To evaluate whether to propose amendments to the energy conservation standards for walk-ins, DOE issued a request for information ("RFI") in the *Federal Register* on July 16, 2021 ("July 2021 RFI"). 86 FR 37687. In the July 2021 RFI, DOE sought data, information, and comment pertaining to walk-ins. 86 FR 37687, 37689. DOE subsequently announced the availability of the preliminary analysis it had conducted for the purpose of evaluating the need for amending the current energy conservation standards for walk-ins in the *Federal Register* on June 30, 2022, ("June 2022 Preliminary Analysis"). The analysis was set forth in the Department's accompanying preliminary technical support document ("TSD"). The June 2022 Preliminary Analysis summarized and addressed the comments received in response to the July 2021 RFI in chapter 2 of the June 2022 Preliminary Analysis TSD. DOE held a public meeting via webinar to discuss and receive comment on the June 2022 Preliminary Analysis on July 22, 2022. The meeting covered the analytical framework, models, and tools that DOE used to evaluate potential standards; the results of the preliminary analyses performed by DOE; the potential energy conservation standard levels derived from those analyses; and other relevant issues.

In a test procedure final rule published May 4, 2023 ("May 2023 TP Final Rule"), DOE amended the test procedures for walk-in components. DOE also established a new appendix, appendix C1 to subpart R ("appendix C1"), and a new energy metric, AWEF2, for refrigeration systems. (*See* 88 FR 28780 and 10 CFR part 431, subpart R, appendix C1.) Manufacturers would be required to begin using appendix C1 as of the compliance date of an energy conservation standards promulgated as a result of this rulemaking.

On September 5, 2023, DOE published a notice of proposed rulemaking in the *Federal Register*, regarding energy conservation standards for walk-in coolers and freezers ("September 2023 NOPR"). 88 FR 60746. Specifically, DOE proposed amended standards for walk-in non-display doors and walk-in refrigeration systems based on the amended or new test procedures adopted in the May 2023 TP Final Rule. For refrigeration systems, DOE proposed amended standards in terms of the AWEF2 metric based on appendix C1. The September 2023 NOPR summarized and addressed comments received in response to the June 2022 Preliminary Analysis. However, comments from one interested party, listed in Table I.4 of this document, were considered in developing the September 2023 NOPR, but were not summarized and discussed in the NOPR.

Table I.4 June 2022 Preliminary Analysis Written Comments Omitted in the September 2023 NOPR

Commenter(s)	Abbreviation	Comment No. in the Docket	Commenter Type
Pacific Gas and Electric Company, Southern California Gas Company, San Diego Gas and Electric, and Southern California Edison; (collectively referred to as the "California Investor-Owned Utilities")	CA IOUs	43	Utilities

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

DOE notes that it also received comments in response to the June 2022 Preliminary Analysis in the form of confidential business information from two stakeholders, which have been restricted on the public docket.[5] To the extent that these stakeholders provided confidential information, DOE did not address those comments directly due to the confidential nature of the comments received. However, DOE considered these confidential comments in its analysis presented in the September 2023 NOPR.

[4] The parenthetical reference provides a reference for information located in the docket of DOE's rulemaking to develop energy conservation standards for walk-ins. (Docket No. EERE-2017-BT-STD-0009, which is maintained at *www.regulations.gov*). The references are arranged as follows: (commenter name, comment docket ID number, page of that document).

[5] DOE received comments marked as confidential business information from Anthony International (see EERE-2017-BT-STD-0009-0040) and Lennox International (*see* EERE-2017-BT-STD-0009-0036).

II. Discussion

This section summarizes the comments received from the CA IOUs and provides DOE's responses that were not addressed in the September 2023 NOPR. Separate subsections address each component of DOE's analyses on which DOE has received comment from the CA IOUs.

A. General

The CA IOUs recommended that DOE consider linear AWEF energy conservation standards for refrigeration systems that vary with capacity. (CA IOUs, No. 43 at p. 3) The CA IOUs stated that refrigeration efficiency typically increases with system capacity and pointed to the energy conservation standards for Commercial Refrigeration Equipment and Automatic Commercial Ice Makers, which are dependent on capacity. (*Id.*) The CA IOUs further provided examples supporting its assertion that efficiency increases with capacity for both dedicated condensing units and unit coolers. Specifically, the CA IOUs showed examples of standard options offered for model lines of medium- and low-temperature unit coolers; these examples show a larger capacity model line that is available with several options that are not available as standard features for the smaller capacity model line, including electronic expansion valves ("EEVs"), evaporator fan control boards, variable-speed electronically commutated fan motors ("ECMs"), and electronic controller systems that offer on-cycle evaporator fan controls and adaptive defrost capability. (*Id.* at pp. 3-4) The CA IOUs also included in its comment examples of dedicated condensing system model lines that showed higher cooling efficiencies (in terms of energy efficiency ratio ("EER")) for larger capacity systems. (*Id.* at p. 4) The CA IOUs also pointed to the baseline AWEFs presented in the preliminary analysis TSD, which increased with capacity. (*Id.* at pp. 5-7)

In its analysis for the September 2023 NOPR, DOE evaluated the economics of each efficiency level for each representative unit, which indicated that more stringent standards were generally economically justified for larger units. Therefore, DOE proposed standards that varied with capacity for many refrigeration system equipment classes in the September 2023 NOPR. 88 FR 60746, 60748-60749. The proposed standards are summarized in section I of the September 2023 NOPR.

B. Market and Technology Assessment

As discussed in the September 2023 NOPR, DOE develops information in the market and technology assessment that provides an overall picture of the market for the equipment concerned, including the purpose of the equipment, the industry structure, manufacturers, market characteristics, and technologies used in the equipment. 88 FR 60746, 60760. This activity includes both quantitative and qualitative assessments, based primarily on publicly available information. The subjects addressed in the market and technology assessment for this rulemaking include (1) a determination of the scope of the rulemaking and equipment classes, (2) manufacturers and industry structure, (3) existing efficiency programs, (4) shipments information, (5) market and industry trends; and (6) technologies or design options that could improve the energy efficiency of walk-ins.

As discussed in the September 2023 NOPR, DOE considered separate technology options for whole walk-ins, doors, and panels, and refrigeration systems. 88 FR 60746, 60764-60765. In the preliminary market analysis and technology assessment, DOE identified 16 technology options that would be expected to improve the efficiency of refrigeration systems. DOE requested comment on the technology options in section ES.4.2 of the June 2022 Preliminary Analysis TSD. In response, the CA IOUs suggested several modifications to the technology options analyzed by DOE in the June 2022 Preliminary Analysis. (CA IOUs, No. 43 at p. 8)

In section 5.7.2.1 of chapter 5 of the June 2022 Preliminary Analysis TSD, DOE stated that at the time, it lacked data on the performance of multiple-capacity and variable-capacity compressors, but DOE intended to collect more data to evaluate these compressors as design options for the NOPR analysis. In response to the June 2022 Preliminary Analysis, the CA IOUs commented that they support the evaluation of variable-capacity compressors as a design option. (CA IOUs, No. 43 at p. 8) The CA IOUs recommended that DOE request full EER curves of amperage versus capacity for variable-capacity compressors from manufacturers. (*Id*.) The CA IOUs also recommended that DOE perform testing to record the efficiency gains of variable-capacity compressors and evaluate the reduction in compressor cycling and improved ability of the compressor to match the system cooling loads. (*Id*. at pp. 8-9)

As discussed in the September 2023 NOPR, DOE analyzed variable-capacity compressors for low- and medium-temperature refrigeration systems and assumed that the system was redesigned to take advantage of the variable-capacity compressor. 88 FR 60746, 60776. However, DOE was unable to obtain performance data from manufacturers as recommended by the CA IOUs, and therefore based the variable-capacity design option performance on its test data. Additional details of the variable-capacity compressor design option implementation in the NOPR analysis can be found in chapter 5 of the accompanying TSD.[6]

In the June 2022 Preliminary Analysis, DOE analyzed floating head pressure and floating head pressure with an EEV as design options for outdoor dedicated condensing units. See section 5.7.2.7 of the June 2022 Preliminary Analysis TSD. In response to the June 2022 Preliminary Analysis, the CA IOUs suggested that DOE analyze EEVs as a technology option separate from floating head pressure. (Ca IOUs, No. 43 at p. 10) The CA IOUs provided an example where the use of an EEV rather than a thermostatic expansion valve ("TXV") saved energy by reducing cycling losses where the TXV "hunts" for the optimal

[6] The NOPR TSD can be found in the docket at *regulations.gov/document/EERE-2017-BT-STD-0009-0046*.

opening range. (*Id.*) Further, the CA IOUs commented that EEVs allow for more precise superheat control over TXVs, which could improve energy efficiency. (*Id.* at p. 10)

DOE notes that the tests conducted as part of the test procedures in appendix C1 are steady-state tests. Because of this, DOE has tentatively concluded that a test performed with a TXV would result in the same measured efficiency as a test of the same unit performed with an EEV. DOE acknowledges that a unit cooler installed with an EEV may be able to achieve more capacity for a given suction condition given that EEVs can achieve less superheat than a TXV would be able to. Considering feedback received during manufacturer interviews, DOE has tentatively concluded that manufacturers would not recommend a lower superheat value for unit coolers installed with an EEV rather than a TXV. Additionally, DOE notes that Figure 8 presented in the CA IOUs comment shows that at the steady-state operation that is the basis of test procedures, systems equipped with TXVs are no less efficient than systems equipped with EEVs. As such DOE has tentatively concluded that when performing a valid refrigeration system test according to the DOE test procedure, replacing a TXV with an EEV would not improve measured efficiency. For this reason, DOE did not analyze EEVs as a standalone technology in the September 2023 NOPR analysis. See section 5.7.2.7 of the September 2023 NOPR TSD for discussion of how DOE considered head pressure control in the analysis.

See chapter 3 of the September 2023 NOPR TSD for further discussion of the market and technology assessment.

C. Engineering Analysis

As discussed in the September 2023 NOPR, the purpose of the engineering analysis is to establish the relationship between the efficiency and cost of each component of walk-ins (*e.g.*, doors, panels, and refrigeration systems). 88 FR 60746, 60767. 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 walk-ins, DOE considers technologies and design option combinations not eliminated by the screening analysis. For each walk-in component equipment class, DOE estimates the baseline cost, as well as the incremental cost for the walk-in component 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).

In section ES4.4 of the June 2022 Preliminary Analysis TSD, DOE requested comment on the efficiency levels considered in the analysis. Specifically, DOE sought feedback on whether the efficiency levels beyond the baseline are appropriate, including the maximum technology efficiency level.

a. Display Doors

The CA IOUs commented that, based on its evaluation, the ratings in DOE's Compliance Certification Management System Database ("CCD") for display doors are conservative. The CA IOUs asserted that the ratings in CCD for display doors should not be used as the basis for establishing an updated energy conservation standard because their analysis suggests the ratings are conservative. Rather, the CA IOUs encouraged DOE to independently evaluate the performance of representative display doors in its analysis. (CA IOUs, No. 43 at pp. 7-8, 21)

In response, DOE notes that it did not analyze higher efficiency levels for display doors solely using data from CCD, but rather conducted testing on doors with varying glass pack designs. See sections 5.6.1 and 5.7.1.1 of the NOPR TSD for further discussion on

DOE's methodology for developing the baseline and higher efficiency energy consumption characteristics for the representative units of display doors analyzed.

b. Refrigeration Systems

The CA IOUs stated that the AWEF levels in CCD are based on the base model of a product line rather than the models that utilize higher efficiency design options. (CA IOUs, No. 43 at p. 3) The CA IOUs also commented that DOE's performance modeling in the June 2022 Preliminary Analysis underestimated the efficiency benefits of the design options currently available in the market. (*Id*.) The CA IOUs recommended that DOE validate the results of the June 2022 Preliminary Analysis by conducting testing on representative examples of walk-in refrigeration systems. (*Id*.)

As discussed in the September 2023 NOPR, DOE used a design-option approach for dedicated condensing units and single-packaged dedicated systems. 88 FR 60746, 60768. DOE's performance modeling of each design option for dedicated condensing units and single-packaged dedicated systems in the September 2023 NOPR analysis was developed with manufacturer feedback through confidential manufacturer interviews. Additionally, DOE notes that is has validated its results of the September 2023 NOPR analysis through its own walk-in refrigeration system testing. See section 5.7.2 of the September 2023 NOPR TSD for details of the refrigeration systems engineering analysis.

Furthermore, DOE used both an efficiency-level approach and design option approach for its analysis of unit coolers, depending on equipment class. 88 FR 60746, 60768. DOE's performance modeling of medium- and low-temperature unit coolers in the September 2023 NOPR analysis was based on the capacities certified in the CCD, fan power data from product literature, and the default defrost energy use from AHRI 1250-2020[7] adjusted such that the lowest calculated AWEFs match the current energy conservation standard. DOE notes that while most of the unit coolers in the CCD are rated at baseline, when AWEF is calculated using the data as described, many units appear to have efficiencies above baseline. DOE has tentatively determined that the results of these analyses are representative of the units and technologies currently available on the market. Details of the unit cooler engineering analysis are discussed in section 5.8 of the September 2023 NOPR TSD.

<u>Refrigerants Analyzed</u>

The CA IOUs commented that it expects that the use of R-404A to estimate the performance of CO_2-based unit coolers (which DOE did in the June 2022 Preliminary Analysis) would result in a similar AWEF to that of an AWEF that was based on performance data of CO_2. However, the CA IOUs recommended that DOE use CO_2 data in its analysis to avoid confusion. The CA IOUs stated that DOE should use available CO_2-specific data, request information from manufacturers, and derive EER curves using software tools. (CA IOUs, No. 43 at p. 14)

DOE acknowledges that there is some performance data available for CO_2 unit-coolers. However, the CCD and manufacturer product literature have more data available for unit coolers that use R-404A. In response to the preliminary analysis, as discussed in the September 2023 NOPR, HTPG supported the use of R-404A to analyze medium- and low-temperature unit coolers. 88 FR 60746, 60779. Additionally, as the CA IOUs stated, the performance results of unit coolers using R-404A and CO_2 are similar. DOE has tentatively

[7] Appendix C1 references industry test standard Air-Conditioning, Heating, and Refrigeration Institute ("AHRI") Standard 1250-2020, *2020 Standard for Performance Rating of Walk-in Coolers and Freezers* ("AHRI 1250-2020").

concluded that using R-404A as the refrigerant for the analysis of medium- and low-temperature unit coolers is representative of the unit cooler market. Therefore, as discussed in the September 2023 NOPR, DOE used R-404A as the refrigerant in its analysis of medium- and low-temperature unit coolers. 88 FR 60746, 60780. Further, DOE notes that the EERs used to calculate unit cooler AWEF and AWEF2 are prescribed by the suction conditions and EER table of the DOE test procedure at section 3.4.14 of appendix C1. As such, DOE did not consider alternative EER curves in the September 2023 NOPR analysis.

Representative Units

In section 2.2 of the June 2022 Preliminary Analysis TSD, DOE stated that it has not seen condensate heaters on any of the single-packaged dedicated systems that it has tested. When making this statement in the June 2022 Preliminary Analysis, DOE was referring to pan heaters. In response, the CA IOUs commented that they are aware of three manufacturers of packaged systems that currently offer a condensate heater element and showed examples of unit coolers that offer drain line heaters as standard features or options. (CA IOUs, No. 43 at pp. 12-14) Additionally, the CA IOUs stated that in specific applications (*e.g.*, meat and dairy coolers) medium-temperature coolers typically use condensate heaters. (*Id.* at p. 12) Therefore, the CA IOUs recommended that AWEF should include an allocation for condensate heater energy use. (*Id.*)

DOE has not encountered drain line heaters on any of the single-packaged dedicated systems or unit coolers that it has tested and DOE expects that drain line heaters would typically be provided as an optional feature and installed by a contractor. In the September 2023 NOPR analysis, DOE evaluated what it considers to be "representative units" in the market; therefore, DOE did not evaluate units with drain line heaters.

DOE has encountered low-temperature unit coolers with pan heaters. In the September 2023 NOPR analysis, DOE based the low-temperature unit cooler defrost power on the default defrost power calculations in AHRI 1250-2020. See section C10.2 of AHRI 1250-2020 for details. These calculated power values are representative of the power draw of the entire unit cooler during a defrost cycle. Additionally, the default defrost power calculations in AHRI 1250-2020 include a set of calculations for units with hot gas coil defrost and an electric resistive pan heater. See section C10.1.2 of AHRI 1250-2020. As such, DOE has tentatively determined that the AHRI 1250-2020 default power calculations include representative pan heater power consumption and that an allocation for condensate heater energy use is not warranted at this time.

Baseline Efficiency

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

The CA IOUs stated that when DOE updates a test procedure for equipment already included in the DOE regulatory program, DOE typically performs a cross-walk analysis to ensure energy conservation standards set using the new test procedure do not result in backsliding. (CA IOUs, No. 43 at p. 1) The CA IOUs commented that the June 2022 Preliminary Analysis TSD does not appear to include a cross-walk analysis (*Id.*) The CA IOUs stated that, therefore, its comments regarding the baseline efficiency assumed the analysis presented in the preliminary TSD was based on the current test procedure at appendix C to subpart R of 10 CFR part 431. (*Id.* at pp. 2-3) Based on this assumption, the CA IOUs encouraged DOE to align the baseline efficiency level of all refrigeration systems with the current minimum energy conservation standards and indicated which representative units they interpreted as having efficiency levels below the current minimum energy conservation standards. *Id.*

Current energy conservation standards for walk-in refrigeration systems are in terms of the AWEF metric and the energy conservation standards proposed in the September 2023 NOPR use the AWEF2 metric. The primary difference between these two metrics is that AWEF2 includes off-cycle power consumption.[8] As discussed in the September 2023 NOPR, DOE set baseline efficiency levels for dedicated condensing units with energy conservation standards at the current minimum standard level using the appendix C test procedure (*see* appendix C to subpart R to 10 CFR 431). 88 FR 60746, 60778. For example, for a medium-temperature, outdoor dedicated condensing unit, DOE determined which technology options would just meet the current AWEF standard of 7.6 Btu/(W-h) using the appendix C test procedure. *Id.* Once each representative unit had its baseline design options set, DOE conducted the remainder of the efficiency analysis using the appendix C1 test procedure to determine AWEF2 values for each efficiency level, including the baseline. *Id.* DOE notes that in the June 2022 Preliminary Analysis, refrigeration system efficiency values were labeled as AWEF; however, all efficiency values calculated in accordance with the appendix C1 test procedure were AWEF2 values, as defined in appendix C1. *Id.*

The representative units that DOE modeled in the September 2023 NOPR analysis were based on actual units that are certified at the currently applicable minimum energy

[8] The complete discussion of the differences between these metrics can be found in the May 2023 Test Procedure Final Rule. 88 FR 28780, 28810.

conservation standards (*i.e.*, baseline AWEF) in CCD. To account for the differences between AWEF and AWEF2, DOE determined representative off-cycle power values for each representative unit analyzed in the September 2023 NOPR using product catalogs and feedback from manufacturer interviews.

Additionally, in the September 2023 NOPR, DOE proposed more stringent energy conservation standards for the majority of refrigeration system equipment classes. 88 FR 60746, 60748-60749. The only equipment classes with standards proposed at the equivalent current baseline in terms of the new AWEF2 metric are medium-temperature indoor dedicated condensing systems with a capacity of less than 8,000 Btu/h and low-temperature indoor dedicated condensing systems with a capacity of 9,000 Btu/h. See section IV.C.1.d of the September 2023 NOPR for further discussion of the analysis based on AWEF2.

<u>Design Options</u>

In chapter 5 of the June 2022 Preliminary Analysis TSD, DOE analyzed improved condenser coils as a design option for dedicated condensing system equipment classes. See section 5.7.2.2 of the Preliminary Analysis TSD for details of this analysis. Based on information gathered during previous rulemakings and feedback received during the preliminary analysis manufacturer interviews, DOE determined representative improved midpoint condensing temperatures for the representative units analyzed. DOE published the following table to summarize the baseline and improved condensing midpoint temperatures.

Table II.1 Walk-in Refrigeration System Condenser Coil Temperature Difference (“TD”) Assumptions

Equipment Class	**Temperature of Air Entering the Condenser Coil *°F***	**Baseline Midpoint *°F***	**Baseline TD *°F***	**Improved Midpoint *°F***	**Improved TD *°F***

SPU.H.I	90	115	20	110	15
DC/SPU.M.I	90	115	25	110	20
DC/SPU.L.I	90	110	20	105	15
SPU.H.O	95	120	20	115	15
DC/SPU.M.O	95	120	25	115	20
DC/SPU.L.O	95	115	20	110	15

In response to the June 2022 Preliminary Analysis, the CA IOUs recommended that DOE should review the baseline and improved condensing midpoint assumptions used for high-temperature single-packaged dedicated systems, as the temperature differences and ambient air temperatures do not sum to equal the corresponding midpoint temperature. (CA IOUs, No. 43 at p. 16)

DOE acknowledges that the baseline and improved temperature differences for high-temperature single-packaged dedicated condensing systems were incorrectly printed in table 5.7.13 in the June 2022 Preliminary Analysis TSD. For high-temperature single-packaged dedicated condensing systems, the table should have listed the baseline temperature difference as 25°F and the improved temperature difference as 20°F. These misprints only occurred in this table and the correct values were used in conducting the June 2022 Preliminary Analysis. Similarly, as discussed in section 5.7.2.2 of the September 2023 NOPR TSD, DOE did not use the incorrect values in the September 2023 NOPR analysis.

In the June 2022 Preliminary Analysis, DOE analyzed head pressure controls as a design option for outdoor dedicated condensing system equipment classes. See section 5.7.2.7 of the June 2022 Preliminary Analysis TSD for details. Head pressure controls allow outdoor condensing units' head pressure to "float" down to a minimum condensing pressure as the ambient air temperature falls. This allows the compressor to operate more efficiently and therefore reduces the power consumption of the system without reducing the capacity. As discussed in section 5.7.2.7 of the June 2022 Preliminary Analysis TSD, DOE evaluated two design options pertaining to head pressure control for the representative units of outdoor dedicated condensing units and outdoor single-packaged dedicated systems analyzed. These two design options were floating head pressure and floating head pressure with an EEV.[9] DOE assumed fixed head pressure would be the baseline design. Based on information collected during previous rulemakings, DOE determined the minimum condensing pressure associated with these design options. DOE converted all minimum condensing pressures to minimum condenser dewpoint temperatures so that the values would be refrigerant agnostic. DOE assumed this minimum dewpoint would apply at the lowest ambient rating condition—35°F. At the intermediate rating temperature of 59°F, DOE estimated the head pressure for fixed and floating systems when using a TXV based on testing results. DOE did not have testing results for a system with an EEV, so DOE calculated the degree to which the pressure would "float" down based on an assumption that the condenser TD would scale with the capacity. DOE used test results and scaling to estimate a minimum dewpoint offset at 59°F. Minimum condensing dewpoints at the 35°F C test point and at the 59°F B test point are summarized in Table II.2.

Table II.2 Summary of Preliminary Analysis Head Pressure Control Design Options

Design Option Description	Minimum Condensing Dewpoint at 35°F (°F)	Minimum Condensing Dewpoint at 59°F (°F)
Fixed head pressure	101.5	104.4
Floating head pressure	85	86.7
Floating head pressure with an electronic expansion valve	67	85.9

[9] Systems equipped with an EEV could operate with an even lower head pressure because the greater flexibility of the electronic controls allows an EEV to have a wider range of orifice open area without leading to unstable operation in warm ambient conditions.

In addition to the minimum condensing dewpoints imposed by head pressure control strategies, different compressor types have different minimum condensing dewpoints. The minimum condensing dewpoint temperatures for hermetic, semi-hermetic, scroll and rotary compressors used in the June 2022 Preliminary Analysis are listed in Table II.3.

Table II.3 Minimum Condensing Dewpoint Temperatures by Compressor Type Used in the June 2022 Preliminary Analysis

Compressor Type	**Minimum Condensing Dewpoint Temperature (°F)**
Hermetic	85
Semi-hermetic	67
Scroll	67
Rotary	67

In response to the June 2022 Preliminary Analysis, the CA IOUs stated that its interpretation of the June 2022 Preliminary Analysis assumed that the minimum condensing pressure is reached only at the 35°F ambient C test condition. (CA IOUs, No. 43 at p. 14) The CA IOUs commented that in its experience, the minimum condensing pressure is reached anytime the ambient temperature plus the condenser temperature difference is less than the minimum condensing temperature and that the minimum condensing pressure is "fixed" (*i.e.*, does not change with lower ambient temperatures) and that controls and valves function to maintain that pressure. (*Id.* at pp. 14-15).

Based on test data and feedback during manufacturer interviews, DOE tentatively concluded that the minimum condensing dewpoint temperature can be reached at ambient temperatures above 35°F. DOE determined the condensing dewpoints at the B (59°F) and C (35°F) test points considering the minimum condensing dewpoint allowed by the floating head pressure controls and compressor type of the representative unit as well as the minimum condensing temperature necessary to achieve a sufficient condenser temperature difference.

The details of this analysis can be found in section 5.7.2.7 of the September 2023 NOPR TSD.

Additionally, the CA IOUs stated that generally, fixed head pressure systems have minimum condensing dewpoint temperatures of 95°F to 120°F and that adding floating head pressure controls with TXVs to these systems allows minimum condensing dewpoint temperatures of 70°F to 85°F and changing the TXVs for EEVs on systems with floating head pressure controls allows temperatures of 55°F to 70°F. (CA IOUs, No. 43 at p. 14) The CA IOUs stated that minimum condensing dewpoint temperature for low-temperature systems can be lower than those for medium-temperature systems. *Id.* DOE determined the minimum condensing dewpoint temperature for the September 2023 NOPR analysis using feedback from confidential manufacturer interviews. DOE aggregated this feedback and tentatively determined that 72°F is a representative minimum condensing dewpoint for the walk-in industry as a whole. During interviews, manufacturers indicated that this was a standard design on all walk-in condensing systems and that this minimum condensing dewpoint temperature could be achieved by systems using TXVs, therefore DOE did not consider an additional step down in pressure associated with EEVs. Based on testing results, DOE tentatively determined that most dedicated condensing systems would need this floating head pressure design option to achieve the current AWEF standards. Feedback from the most recent round of manufacturer interviews confirmed this. As such DOE considered floating head pressure controls as the baseline design option for all dedicated condensing system representative units in the September 2023 NOPR analysis and did not consider floating head pressure controls with an EEV as a design option. See section 5.7.2.7 of the September 2023 NOPR TSD for details of this analysis.

Additionally, the CA IOUs stated that the minimum condensing dewpoints allowed by the compressor operating envelopes in DOE's June 2022 Preliminary Analysis are too high and provided examples of semi-hermetic compressors with lower minimum condensing dewpoints. (CA IOUs, No. 43 at p. 15)

Information obtained during previous rulemakings and manufacturer feedback received during the most recent interviews indicated that the operating envelope of hermetic reciprocating compressors would limit the minimum condensing dewpoint further. As such, DOE set the minimum condensing dewpoint for hermetic compressors at 85°F. DOE acknowledges that the published operating envelope of semi-hermetic, scroll, and rotary compressors may allow for condensing dewpoints lower than 72°F. However, manufacturers indicated that in spite of the lower dewpoints published in compressor literature, they and their customers have concerns about the potential system reliability issues. The 72°F is representative of the lowest dew point levels used for rating purposes by manufacturers. In many cases this level can be adjusted in the field, and it often is set higher. As such, DOE did not consider condensing dewpoints lower than 72°F in the September 2023 NOPR analysis. The floating head pressure design option is discussed in more detail in section 5.7.2.7 of chapter 5 of the September 2023 NOPR TSD.

The CA IOUs recommended that DOE use the minimum condensing midpoint instead of the minimum condensing dewpoint in its analysis when discussing floating head pressure control. (CA IOUs, No. 43 at p. 15) As discussed in section 5.5.3.1 of the September 2023 NOPR TSD, DOE used the compressor model described in section 6.4 of AHRI Standard 540-2004, "Performance Rating of Positive Displacement Refrigerant Compressors and Compressor Units" to determine compressor power consumption and mass flow at each test condition. This model requires condensing dewpoint, rather than mid-point, as an input.

Therefore, DOE used condensing dewpoint to characterize the floating head pressure design option.

In the June 2022 Preliminary Analysis, DOE did not analyze on-cycle evaporator fan control as a design option because DOE had tentatively determined that variable-capacity compressors are a prerequisite for on-cycle evaporator fan controls to be effective. DOE did not analyze variable-capacity compressors as a design option in the June 2022 Preliminary Analysis because it had insufficient data at the time to analyze them. See section 5.7.2.13 of the June 2022 Preliminary Analysis TSD.

In response, the CA IOUs agreed that on-cycle evaporator fan controls are most effective when paired with variable-capacity compressors, but referenced methods of fan control that could provide efficiency benefits without a multiple- or variable-capacity compressor. Therefore, the CA IOUs suggested that evaporator fan on-cycle control should be evaluated as a design option for single-packaged dedicated systems without a multiple- or variable-capacity compressor. (CA IOUs, No. 43 at p. 9) The CA IOUs provided two examples of how evaporator fan control could result in energy savings: (1) setting fan speed using refrigerant liquid temperature change across the expansion valve; and (2) setting fan speed based on walk-in interior temperature and refrigerant coil temperature using an electronic expansion valve ("EEV") to control superheat. *Id.* Further, the CA IOUs commented that evaporator fans included in a walk-in system are based on ambient design conditions, which may only occur a few days per year and provided an example of a unit cooler that has evaporator fans running below full load for a majority of the time. (*Id.* at pp. 9-10)

DOE interprets the first fan control method described in the CA IOUs comment to be a reduction in fan power when the liquid line solenoid closes, indicating the compressor is cycling off. DOE considered off-cycle fan control for single-packaged dedicated systems in the September 2023 NOPR analysis, discussed in detail in section 5.7.2.8 of the September 2023 NOPR TSD. Based on the description of the second fan control method described in the CA IOUs comment, DOE has tentatively determined that when operating in a test chamber held at a constant temperature (consistent with the test procedure approach of testing with constant evaporator inlet air condition or constant condensing unit suction inlet condition) such a control system would not trigger any reduction in fan speed. Therefore, when tested according to the DOE test procedure in appendix C1 to 10 CFR part 431 subpart R ("appendix C1") a single-packaged dedicated system equipped with this evaporator fan control system would not have an improved efficiency. In addition, DOE notes that the figure provided as an example in the CA IOUs' comment shows condenser fan run time, not evaporator fan run time. DOE did consider on-cycle condenser fan controls in the September 2023 NOPR analysis. 88 FR 60746, 60767.

In the June 2022 Preliminary Analysis DOE analyzed permanent-split capacitor ("PSC") and ECM motors as design options for improved condenser fan motors, and did not analyze improved evaporator fan motors as a design option. See sections 5.7.2.4 and 5.7.2.11 of the June 2022 Preliminary Analysis TSD. In response, the CA IOUs commented that DOE should consider permanent magnet AC ("PMS") motors as the maximum-technologically-feasible design option for unit cooler fan motors and as a technology option for condensing unit fan motors. The CA IOUs cited examples of how PMS motor efficiency compares with ECM efficiency, specifically stating that PMS motors can offer an average of 17-27 percent energy savings over ECMs for unit cooler fan motors and 40 percent savings over permanent-split capacitor ("PSC") motors that are mostly installed in condensing units. The

CA IOUs stated that several utility and efficiency organizations offer rebate programs to upgrade ECMs with PMS motors. However, the CA IOUs stated that PMS motors are not available in new equipment and that it was only aware of one manufacturer offering PMS motors. (CA IOUs, No. 43 at pp. 11-12)

EPCA governs permissible evaporator and condenser fan motors in walk-ins (42 U.S.C. 6313(f)(1)(E) and (F)). For condenser fan motors under 1 horsepower ("HP"), EPCA prescribes the use of either ECMs, permanent split capacitor ("PSC") type motors, or 3-phase motors. (42 U.S.C. 6313(f)(1)(F)) DOE only analyzed one representative unit with condenser fan motors equal to or greater than 1 HP in the September 2023 NOPR analysis, which did not include a permanent magnet AC motor. Given that EPCA does not allow the use of any other motor types for motors under 1 horsepower, DOE did not consider permanent magnet AC motors as a design option for condenser fan motors.

For evaporator fan motors under 1 HP, EPCA prescribes the use of either ECMs or 3-phase motors. (42 U.S.C. 6313(f)(1)(E)) DOE has adopted this requirement in its regulations at 10 CFR 431.306(a)(5)(i)-(ii). DOE has encountered commercially available motor technologies that may perform more efficiently than the ECMs already required by the prescriptive standard. However, consistent with the EPCA requirements and existing regulations, DOE did not include them in its September 2023 NOPR analysis. See section 5.7.2.11 of the September 2023 NOPR TSD. Additionally, DOE notes that all evaporator fan powers are under the 1 HP threshold for the representative units analyzed at the proposed standard levels in the September 2023 NOPR.

D. Life-Cycle Cost and Payback Period Analysis

As discussed in the September 2023 NOPR, DOE conducted LCC and PBP analyses to evaluate the economic impacts on individual consumers of potential energy conservation standards for walk-ins. 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 walk-ins 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 equipment class, DOE calculated the LCC and PBP for a nationally representative set of commercial consumers. As stated previously, DOE developed household samples from the 2018 Commercial Buildings Energy Consumption Survey ("CBECS").[10] For each sample, DOE determined the energy consumption for the walk-ins and the appropriate energy price. By developing a

[10] U.S. Energy Information Administration. *Commercial Buildings Energy Consumption Survey 2018*, 2022.

representative sample of commercial consumers, the analysis captured the variability in energy consumption and energy prices associated with the use of walk-ins.

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 product lifetime, discount rates, and sales taxes, with probabilities attached to each value, to account for their uncertainty and variability.

The computer model DOE uses to calculate the LCC 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 walk-ins user samples. The model calculated the LCC for products at each efficiency level per simulation run. The analytical results include a distribution of 30,000 data points for refrigeration systems and 10,000 data points for envelope components, showing the range of LCC savings for a given efficiency level relative to the no-new-standards case efficiency distribution. In performing an iteration of the Monte Carlo simulation for a given consumer, 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 calculation reveals that a consumer is not impacted by the standard level. By accounting for consumers who already purchase more-efficient products, DOE avoids overstating the potential benefits from increasing product efficiency.

DOE calculated the LCC and PBP for consumers of walk-ins as if each were to purchase a new product in the expected year of required compliance with new or amended standards. Amended standards would apply to walk-ins manufactured three years after the date on which any new or amended standard is published. (42 U.S.C. 6313(f)(5)(B)(i)) At this time, DOE estimates publication of a final rule in 2024; therefore, for purposes of its analysis, DOE used 2027 as the first year of compliance with any amended standards for walk-ins.

Table II.4 summarizes the approach and data DOE used to derive inputs to the LCC and PBP calculations. 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 September 2023 NOPR TSD and its appendices.

Table II.4 Summary of Inputs and Methods for the September 2023 NOPR LCC and PBP Analysis*

Inputs	**Source/Method**
Product Cost	Derived by multiplying MPCs by manufacturer and retailer markups and sales tax, as appropriate. Used historical data to derive a price scaling index to project product costs.
Installation Costs	Baseline installation cost determined with data from RS Means. Assumed no change with efficiency level.
Annual Energy Use	The total annual energy use multiplied by the buildings containing WICF. Variability: Based on the CBECS 2018.
Energy Prices	Electricity: Based on EIA's Form 861 data for 2021. Variability: Regional energy prices determined for 9 divisions.
Energy Price Trends	Based on *AEO2023* price projections.
Repair and Maintenance Costs	Assumed no change with efficiency level.
Product Lifetime	Average: between 9 and 12 years.
Discount Rates	Approach involves identifying all possible debt or asset classes that might be used to purchase the considered appliances, or might be affected indirectly. Primary data source was the Federal Reserve Board's Survey of Consumer Finances.
Compliance Date	2027

* Not used for PBP calculation. References for the data sources mentioned in this table are provided in the sections following the table or in chapter 8 of the September 2023 NOPR TSD.

1. Consumer Sample

As discussed in the September 2023 NOPR DOE conducts its analysis in support of a potential new minimum efficiency standard at the National level. This means that DOE must distribute its sample of consumers of walk-in equipment throughout the Nation to capture variability of key inputs of walk-ins operation. Specifically, for the annual energy use estimate, DOE is concerned about distributing the population of walk-in installations across different regions to capture variability in equipment installation saturations and electricity prices, which will impact the operating cost of the equipment. This distribution of installations is referred to as the "consumer sample."

The CA IOUs suggested that DOE revise the distribution of weights of WICF equipment by sector. (CA IOUs, No. 43 at pp. 18–19)

As stated in the September 2023 NOPR, DOE used data supplied by AHRI and CBECS to estimate the number of walk-in installations by sector and Census Division. 88 FR 60746, 60792. The weights of each representative unit by sector are repeated from the September 2023 NOPR here in Table II.5 through Table II.7.[11] These weights show that dedicated condensing systems are evenly spread across all sectors, with small business sectors limited to smaller capacity equipment. Additionally, single-packaged dedicated condensing systems are limited to the small business sectors and concentrated in the food service sector.

Table II.5 Consumer Sample and Weights – Dedicated Condensing Units (%)

Equipment Class	**Sector**		**Capacity (kBtu/hr)**					
	Cat.	**Size**	**3**	**9**	**25**	**54**	**75**	**124**
DC.L.I	Other	Large	23	18	4	10	-	-
		Small	1	1	0	0	-	-

[11] A full breakdown of the consumer sample showing the distribution of equipment by Census Division can be found in appendix 8E of the September 2023 NOPR TSD.

	Sales	Large	4	3	1	2	-	-
		Small	3	3	1	0	-	-
	Service	Large	5	4	1	2	-	-
		Small	7	6	1	0	-	-
DC.L.O	Other	Large	7	25	7	5	14	-
		Small	0	2	0	0	0	-
	Sales	Large	1	4	1	1	2	-
		Small	1	4	1	0	0	-
	Service	Large	1	6	1	1	3	-
		Small	2	8	2	0	0	-
DC.M.I	Other	Large	12*	30	7	4	0	-
		Small	1*	2	0	0	0	-
	Sales	Large	2*	5	1	1	0	-
		Small	2*	4	1	0	0	-
	Service	Large	3*	6	1	1	0	-
		Small	4*	9	2	0	0	-
DC.M.O	Other	Large	3*	30	9	2	6	6
		Small	0*	2	1	0	0	0
	Sales	Large	1*	5	2	0	1	1
		Small	0*	4	1	0	0	0
	Service	Large	1*	7	2	0	1	1
		Small	1*	9	3	0	0	0

* For the September 2023 NOPR DOE did not consider the impacts of representative units DC.M.I and DC.M.O at the 3 kBtu/hr capacity (*see* the Representative Units subsection of section IV.C.1.d of the September 2023 NOPR 88 FR 60746, 60780). However, these capacities persist within the consumer sample as they are still distributed in commerce, and the impacts for the fraction of these equipment must be accounted for when determining overall costs and benefits for DC.M.I and DC.M.O as equipment classes even if efficiency improvements are not being considered for these specific capacities.

Table II.6 Consumer Sample and Weights – Single-Packaged Dedicated Systems (%)

Equipment Class	Sector		Capacity (kBtu/hr)			
	Cat.	Size	2	6	7	9
SP.H.I	Other	Large	0	-	0	-
		Small	0	-	0	-
	Sales	Large	0	-	0	-
		Small	0	-	0	-
	Service	Large	0	-	0	-
		Small	74	-	26	-
SP.H.ID	Other	Large	0	-	0	-
		Small	0	-	0	-
	Sales	Large	0	-	0	-
		Small	0	-	0	-
	Service	Large	0	-	0	-
		Small	74	-	26	-
SP.H.O	Other	Large	0	-	0	-

		Small	0	-	0	-
	Sales	Large	0	-	0	-
		Small	0	-	0	-
	Service	Large	0	-	0	-
		Small	22	-	78	-
SP.H.OD	Other	Large	0	-	0	-
		Small	0	-	0	-
	Sales	Large	0	-	0	-
		Small	0	-	0	-
	Service	Large	0	-	0	-
		Small	22	-	78	-
SP.L.I	Other	Large	0	0	-	-
		Small	9	4	-	-
	Sales	Large	0	0	-	-
		Small	19	9	-	-
	Service	Large	0	0	-	-
		Small	41	18	-	-
SP.L.O	Other	Large	0	0	-	-
		Small	3	9	-	-
	Sales	Large	0	0	-	-
		Small	7	21	-	-
	Service	Large	0	0	-	-
		Small	15	45	-	-
SP.M.I	Other	Large	0	-	-	0
		Small	3	-	-	10
	Sales	Large	0	-	-	0
		Small	6	-	-	22
	Service	Large	0	-	-	0
		Small	14	-	-	46
SP.M.O	Other	Large	0	-	-	0
		Small	1	-	-	12
	Sales	Large	0	-	-	0
		Small	2	-	-	26
	Service	Large	0	-	-	0
		Small	3	-	-	56

Table II.7 Consumer Sample and Weights – Unit Coolers (%)

Equipment Class	Sector		Capacity (kBtu/hr)				
	Cat.	Size	3	9	25	54	75
UC.H.I*	Other	Large	-	0	0	-	-
		Small	-	0	0	-	-
	Sales	Large	-	0	0	-	-
		Small	-	0	0	-	-
	Service	Large	-	30	11	-	-
		Small	-	43	16	-	-

UC.H.ID	Other	Large	-	0	0	-	-
		Small	-	0	0	-	-
	Sales	Large	-	0	0	-	-
		Small	-	0	0	-	-
	Service	Large	-	30	11	-	-
		Small	-	43	16	-	-
UC.L.I	Other	Large	18	16	4	14	0
		Small	1	1	0	1	0
	Sales	Large	3	3	1	3	0
		Small	3	2	1	2	0
	Service	Large	4	3	1	3	0
		Small	6	5	1	5	0
UC.L.M	Other	Large	2	21	28	8	8
		Small	0	0	0	0	0
	Sales	Large	0	4	5	1	1
		Small	0	0	0	1	1
	Service	Large	0	5	6	2	2
		Small	1	0	0	2	2
UC.L.O	Other	Large	6	22	7	7	10
		Small	0	1	0	0	1
	Sales	Large	1	4	1	1	2
		Small	1	3	1	1	2
	Service	Large	1	5	2	2	2
		Small	2	7	2	2	3
UC.M.I	Other	Large	10	27	8	7	0
		Small	1	2	1	0	0
	Sales	Large	2	5	1	1	0
		Small	1	4	1	1	0
	Service	Large	2	6	2	1	0
		Small	3	9	2	2	0
UC.M.M	Other	Large	2	29	19	8	8
		Small	0	0	0	0	0
	Sales	Large	0	5	3	1	1
		Small	0	0	0	1	1
	Service	Large	0	6	4	2	2
		Small	1	0	0	2	2

*For unit coolers, the index I, O, and M indicate that the unit cooler is connected to an Indoor, Outdoor, or Multiplex condensing system.

2. Equipment Lifetime

When determining lifetimes, DOE calculates a Weibull distribution of potential lifetimes from average and maximum lifetime for the different types of equipment under consideration. In response to the June 2022 Preliminary Analysis, the CA IOUs suggested alternative lifetime estimates for walk-ins. As published data on WICF lifetimes are unavailable, the CA IOUs' lifetime estimates were sourced from technician interviews from a mechanical engineering firm. The stated lifetimes differ from those used by DOE in the June 2022 Preliminary Analysis [12], and September 2023 NOPR (88 FR 60746, 60798), and are shown in Table II.8 for comparison. (CA IOUs, No. 43 at pp. 17-18)

Table II.8 Estimated WICF Lifetimes (years)

Equipment Category	**DOE**		**CA IOU**	
	Average (years)	**Maximum (years)**	**Average (years)**	**Maximum (years)**
Panels	12	25	20	25
Display Doors	12	25	7	15
Non-display Doors	8.5	12	10	15
Indoor Dedicated Condensing Systems	10.5	20	12	15
Outdoor Condensing Systems	10.5	20	6	15
Medium Temperature Unit Coolers	10.5	20	17	20
Low Temperature Unit Coolers	10.5	20	17	15 to 20
Sigle-packaged Condensing Systems	10.5	20	12*	15*

* Indicates that an estimate was not available, however commenters indicated that lifetimes would be like indoor-dedicated condensing systems.

The CA IOUs' comment did not indicate if their interviewees were referencing lifetimes of walk-ins in the National scope or only California. DOE also notes that the very close average and maximum lifetime values for panels, indoor dedicated condensing systems, and unit coolers (medium-, and low-temperature) to be unlikely. DOE's lifetimes were initially determined in response to comments for the June 2014 Final Rule (79 FR 32086). Other than the information provided by the CA IOUs, DOE received comment from AHRI in response to the July 2021 RFI in support of the existing lifetimes. (AHRI, No. 16 at p. 15) Given some of DOE's questions about the CA IOUs supplied lifetimes, DOE tentatively determined to maintain its use of the lifetimes from the June 2022 Preliminary Analysis in

[12] See: June 2022 Preliminary Analysis Executive Summary, p. ES-20, June 2022 *www.regulations.gov/document/EERE-2017-BT-STD-0009-0024*

the September 2023 NOPR. DOE welcomes additional information on this topic in response to the September 2023 NOPR.

E. Conclusion

As discussed in the preceding sections, DOE has considered the comments provided by the CA IOUs in response to the June 2022 Preliminary Analysis. This document provides responses to the CA IOUs' comments that were not included in the September 2023 NOPR, but does not change the analysis or proposals presented in the NOPR. DOE welcomes comment on the information presented in the September 2023 NOPR, including the additional comment summaries and responses presented in this notification.

III. Procedural Issues and Regulatory Review

DOE has concluded that the tentative determinations made pursuant to the various procedural requirements applicable to the September 2023 NOPR remain unchanged for this notification. These tentative determinations are set forth in the September 2023 NOPR. 88 FR 60746, 60855-60861.

IV. Public Participation

Please refer to section VII of the September 2023 NOPR for information regarding the public webinar, submission of comments, and issues on which DOE seeks comment. 88 FR 60746, 60861-60863. DOE additionally welcomes comment on the information presented in this notification.

V. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this notification of data availability regarding energy conservation standards.

Signing Authority

This document of the Department of Energy was signed on September 21, 2023, by Jeffrey Marootian, Principal Deputy 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 September 25, 2023.

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Treena V. Garrett
Federal Register Liaison Officer,
U.S. Department of Energy

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