DEPARTMENT OF ENERGY

10 CFR Parts 429 and 431

[EERE–2017–BT–STD–0017]

RIN 1904–AD92

Energy Conservation Program: Energy Conservation Standards for Dehumidifying Direct-Expansion Dedicated Outdoor Air Systems

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

ACTION: Notice of proposed rulemaking and request for comment.

SUMMARY: In this notice of proposed rulemaking (NOPR), DOE proposes to establish new energy conservation standards for dehumidifying direct-expansion dedicated outdoor air systems (DX–DOASes) that are of equivalent stringency as the minimum levels specified in the amended American Society of Heating, Refrigerating and Air-Conditioning Engineers (''ASHRAE'') Standard 90.1 ''Energy Standard for Buildings Except Low-Rise Residential Buildings'' (''ASHRAE Standard 90.1'') when tested pursuant to the most recent applicable industry standard for this equipment. DOE has preliminarily determined that it lacks clear and convincing evidence to adopt standards more stringent than the levels specified in ASHRAE Standard 90.1. DOE also announces a public meeting via webinar to receive comment on these proposed standards and associated analyses and results.

DATES: DOE will hold a public meeting via webinar on Monday, February 28, 2022, from 1:00 p.m. to 4:00 p.m. See section VIII, ''Public Participation,'' for webinar registration information, participant instructions and information about the capabilities available to webinar participants.

Comments: DOE will accept comments, data, and information regarding this NOPR no later than April 4, 2022.

Comments regarding the likely competitive impact of the proposed standard should be sent to the Department of Justice contact listed in the **ADDRESSES** section on or before March 3, 2022.

ADDRESSES: Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at *www.regulations.gov.* Follow the instructions for submitting comments. Alternatively, interested persons may submit comments, identified by docket number EERE–2017–BT–STD–0017, by any of the following methods:

1. *Federal eRulemaking Portal: www.regulations.gov.* Follow the instructions for submitting comments.

2. *Email:* to *CommACHeating EquipCat2017STD0017@ee.doe.gov.* Include docket number EERE–2017–BT–STD–0017 in the subject line of the message.

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

Although DOE has routinely accepted public comment submissions through a variety of mechanisms, including postal mail and hand delivery/courier, the Department has found it necessary to make temporary modifications to the comment submission process in light of the ongoing corona virus 2019 (COVID–19) pandemic. DOE is currently suspending receipt of public comments via postal mail and hand delivery/courier. If a commenter finds that this change poses an undue hardship, please contact Appliance Standards Program staff at (202) 586–1445 to discuss the need for alternative arrangements. Once the COVID–19 pandemic health emergency is resolved, DOE anticipates resuming all of its regular options for public comment submission, including postal mail and hand delivery/courier.

Docket: The docket for this activity, which includes **Federal Register** notices, comments, and other supporting documents/materials, is available for review at *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-2017-BT-STD-0017.* The docket web page contains instructions on how to access all documents, including public comments, in the docket. See section VIII for information on how to submit comments through *www.regulations.gov.*

Written comments regarding the burden-hour estimates or other aspects of the collection-of-information requirements contained in this proposed rule may be submitted to Office of Energy Efficiency and Renewable Energy following the instructions at *www.reginfo.gov.*

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

FOR FURTHER INFORMATION CONTACT:

Ms. Catherine Rivest, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, EE–5B, 1000 Independence Avenue SW, Washington, DC 20585–0121. Email: *ApplianceStandardsQuestions@ee.doe.gov.*

Mr. Matthew Ring, U.S. Department of Energy, Office of the General Counsel, GC–33, 1000 Independence Avenue SW, Washington, DC 20585–0121. Telephone: (202) 586–2555. Email: *Matthew.Ring@hq.doe.gov.*

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

SUPPLEMENTARY INFORMATION: DOE proposes to incorporate by reference the following industry standards into part 429:

Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Standard 920–2020 (I–P), ''2020 Standard for Performance Rating of Direct Expansion-Dedicated Outdoor Air System Units,'' approved February 4, 2020.

American National Standards Institute (ANSI)/AHRI Standard 1060–2018, ''2018 Standard for Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment,'' approved 2018.

Copies of AHRI Standard 920–2020 (I–P), and ANSI/AHRI Standard 1060–2018 can be obtained from the Air-conditioning, Heating, and Refrigeration Institute, 2311 Wilson Blvd., Suite 400, Arlington, VA 22201, (703) 524–8800, or online at: *www.ahrinet.org.*

For a further discussion of these standards, see section VII.L of this document.

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I. Synopsis of the Proposed Rule

Title III, Part C [1] of the Energy Policy and Conservation Act, as amended (EPCA),[2] established the Energy Conservation Program for Certain Industrial Equipment. (42 U.S.C. 6311–6317) Such equipment includes dehumidifying direct-expansion dedicated outdoor air systems (DX–DOASes), the subject of this proposed rulemaking.

EPCA requires DOE to amend the existing Federal energy conservation standard for certain types of listed commercial and industrial equipment (generally, commercial water heaters, commercial packaged boilers, commercial air-conditioning and heating equipment, and packaged terminal air conditioners and heat pumps) each time ASHRAE Standard 90.1 is amended with respect to such equipment. (42 U.S.C. 6313(a)(6)(A)) For each type of equipment, EPCA directs that if ASHRAE Standard 90.1 is amended, DOE must adopt amended energy conservation standards at the updated efficiency level in ASHRAE Standard 90.1, unless clear and convincing evidence supports a determination that adoption of a more stringent efficiency level as a national standard would produce significant additional energy savings and be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii))

If DOE adopts as a uniform national standard the efficiency levels specified in the amended ASHRAE Standard 90.1, DOE must establish such standard not later than 18 months after publication of the amended industry standard. (42 U.S.C. 6313(a)(6)(A)(ii)(I)) If DOE determines that a more-stringent standard is appropriate under the statutory criteria, DOE must establish such more-stringent standard not later than 30 months after publication of the revised ASHRAE Standard 90.1. (42 U.S.C. 6313(a)(6)(B))

ASHRAE officially released the 2016 edition of ASHRAE Standard 90.1 (ASHRAE Standard 90.1–2016) on October 26, 2016, which for the first time created separate equipment classes for DX–DOASes with corresponding standards, thereby triggering DOE's above referenced obligations pursuant to EPCA to either: (1) Establish uniform national standards for DX–DOASes at the minimum levels specified in the amended ASHRAE Standard 90.1; or (2) adopt more stringent standards based on clear and convincing evidence that adoption of such standards would produce significant additional energy savings and be technologically feasible and economically justified. ASHRAE Standard 90.1–2016 set minimum efficiency levels using the integrated seasonal moisture removal efficiency (ISMRE) metric for all DOAS classes and the integrated seasonal coefficient of performance (ISCOP) metric for air-source heat pump and water-source heat pump DOAS classes. ASHRAE Standard 90.1–2016 specifies that both metrics are measured in accordance with Air-conditioning, Heating, and Refrigeration Institute (AHRI) Standard 920–2015, ''Performance Rating of DX-Dedicated Outdoor Air System Units'' (AHRI 920–2015).[3] Subsequently, AHRI took to revise AHRI 920.

In October 2019, ASHRAE officially released the 2019 edition of ASHRAE Standard 90.1 (ASHRAE Standard 90.1–2019). ASHRAE Standard 90.1 did not update the energy efficiency levels for DX–DOASes established in ASHRAE Standard 90.1–2016. On February 4, 2020 AHRI officially released the 2020 edition of AHRI 920 (AHRI 920–2020), which addresses a number of issues with the prior test procedure and provides an updated ISMRE metric (*i.e.,* ISMRE2) and an updated ISCOP metric (*i.e.,* ISCOP2).

In accordance with the EPCA provisions discussed, DOE proposes new energy conservation standards for DX–DOASes. The proposed standards, which are expressed in terms of ISMRE2 for all DX–DOAS classes in dehumidification mode, and ISCOP2 for heat pump DX–DOAS classes in heating mode, are shown in Table I.1. DOE has tentatively determined that the proposed standards, which are expressed in terms of ISMRE2 and

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

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

[3] AHRI 920–2015 additionally references ASHRAE Standard 198–2013, ''Method of Test for Rating DX-Dedicated Outdoor Air Systems for Moisture Removal Capacity and Moisture Removal Efficiency'' (ASHRAE Standard 198–2013), as the method of test for DX–DOAS units.

ISCOP2, are of equivalent stringency as the standards in ASHRAE Standard 90.1–2016 (and ASHRAE Standard 90.1–2019), which are expressed in terms of ISMRE and ISCOP. DOE proposes that the standards, if adopted, would apply to all DX–DOASes listed in Table I.1 manufactured in, or imported into, the United States starting on the date 18 months following the effective date of a final rule adopting such standards.

TABLE I.1—PROPOSED ENERGY CONSERVATION STANDARDS FOR DX–DOASES

Equipment type	Subcategory	Efficiency level
Dehumidifying direct-expansion dedicated outdoor air systems.	(AC)—Air-cooled without ventilation energy recovery systems.	ISMRE2 = 3.8.
	(AC w/VERS)—Air-cooled with ventilation energy recovery systems.	ISMRE2 = 5.0.
	(ASHP)—Air-source heat pumps without ventilation energy recovery systems.	ISMRE2 = 3.8, ISCOP2 = 2.05.
	(ASHP w/VERS)—Air-source heat pumps with ventilation energy recovery systems.	ISMRE2 = 5.0, ISCOP2 = 3.20.
	(WC)—Water-cooled without ventilation energy recovery systems.	ISMRE2 = 4.7.
	(WC w/VERS)—Water-cooled with ventilation energy recovery systems.	ISMRE2 = 5.1.
	(WSHP)—Water-source heat pumps without ventilation energy recovery systems.	ISMRE2 = 3.8, ISCOP2 = 2.13.
	(WSHP w/VERS)—Water-source heat pumps with ventilation energy recovery systems.	ISMRE2 = 4.6, ISCOP2 = 4.04.

DOE has tentatively determined that, based on the information presented and its analyses, there is not clear and convincing evidence that more stringent efficiency levels for this equipment would result in a significant additional amount of energy savings, is technologically feasible and economically justified. Clear and convincing evidence would exist only where the specific facts and data made available to DOE regarding a particular ASHRAE amendment demonstrates that there is no substantial doubt that a standard more stringent than that contained in the ASHRAE Standard 90.1 amendment is permitted because it would result in a significant additional amount of energy savings, is technologically feasible and economically justified. DOE normally performs multiple in-depth analyses to determine whether there is clear and convincing evidence to support more stringent energy conservation standards (*i.e.,* whether more stringent standards would produce significant additional conservation of energy and be technologically feasible and economically justified). However, as discussed in the sections, III.D.1.a., III.D.1.b., III.D.3.a., and III.D.3.b of this NOPR, due to the lack of available market and performance data, DOE is unable to conduct the analysis necessary to evaluate the potential energy savings or evaluate whether more stringent standards would be technologically feasible or economically justifiable, with sufficient certainty. As such, DOE is not proposing standards at levels more stringent than those specified in ASHRAE Standard 90.1–2016 (and ASHRAE Standard 90.1–2019).

II. Introduction

The following section briefly discusses the statutory authority underlying this proposed rule, as well as some of the relevant historical background related to the establishment of standards for DX–DOASes.

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, added by Public Law 95–619, Title IV, section 441(a) (42 U.S.C. 6311–6317, as codified), established the Energy Conservation Program for Certain Industrial Equipment, which sets forth a variety of provisions designed to improve energy efficiency. Small, large, and very large commercial package air conditioning and heating equipment are included in the list of ''covered equipment'' for which DOE is authorized to establish and amend energy conservation standards and test procedures. As discussed in the following section, this includes Unitary DOASes and, more specifically, dehumidifying Unitary DOASes, which are the subject of this notice. (42 U.S.C. 6311(1)(B)–(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 specifically 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).

Additionally, DOE is to consider amending the energy efficiency standards for certain types of commercial and industrial equipment, including the equipment at issue in this document, whenever ASHRAE amends the standard levels or design requirements prescribed in ASHRAE/IES Standard 90.1, and at a minimum, every six 6 years. (42 U.S.C. 6313(a)(6)(A)–(C))

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 each covered product. (42 U.S.C. 6314) 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.

Federal energy efficiency requirements for covered equipment established under EPCA generally supersede State laws and regulations concerning energy conservation testing, labeling, and standards. (42 U.S.C.

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

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

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 covered products in the type (or class) compared to any increase in the price, initial charges, or maintenance expenses for the covered products that are likely to result from the standard;

(3) The total projected amount of energy (or as applicable, water) savings likely to result directly from the standard;

(4) Any lessening of the utility or the performance of the covered 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 and water conservation; and

(7) Other factors the Secretary of Energy (''Secretary'') considers relevant. (42 U.S.C. 6313(a)(6)(B)(ii)(I)–(VII))

In relevant part, subparagraph (B) specifies that: (1) In making a determination of economic justification, DOE must consider, to the maximum extent practicable, the benefits and burdens of an amended standard based on the seven criteria described in EPCA; (2) DOE may not prescribe any standard that increases the energy use or decreases the energy efficiency of a covered product; and (3) DOE may not prescribe any standard that interested persons have established by a preponderance of evidence is likely to result in the unavailability in the United States of any 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)(ii)–(iii))

EPCA also contains what is known as an ''anti-backsliding'' provision, which prevents the Secretary from prescribing any amended standard that either increases the maximum allowable energy use or decreases the minimum required energy efficiency of a covered product. (42 U.S.C. 6313(a)(6)(B)(iii)(I)))

Unitary DOASes (and DX–DOASes) had not previously been addressed in DOE rulemakings and are not currently subject to Federal test procedures or energy conservation standards.

B. Background

EPCA defines ''commercial package air conditioning and heating equipment'' as air-cooled, water-cooled, evaporatively-cooled, or water source (not including ground water source) electrically operated, unitary central air conditioners and central air conditioning heat pumps for commercial application.[4] (42 U.S.C. 6311(8)(A); 10 CFR 431.92) Industry standards generally describe unitary central air conditioning equipment as one or more factory-made assemblies that normally include an evaporator or cooling coil and a compressor and condenser combination. Units equipped to also perform a heating function are included as well.[5] Unitary DOASes provide conditioning of outdoor ventilation air using a refrigeration cycle (which normally consists of a compressor, condenser, expansion valve, and evaporator),[6] and therefore, DOE has initially concluded that Unitary DOASes are a category of commercial package air conditioning and heating equipment subject to EPCA.

From a functional perspective, Unitary DOASes operate similarly to other categories of commercial package air conditioning and heat pump equipment, in that they provide conditioning using a refrigeration cycle. Unitary DOASes provide ventilation and conditioning of 100-percent outdoor air to the conditioned space, whereas for typical commercial package air conditioners that are central air conditioners, outdoor air makes up only a small portion of the total airflow (usually less than 50 percent). Unitary DOASes are typically installed in addition to a local, primary cooling or heating system (*e.g.,* commercial unitary air conditioner, variable refrigerant flow system, chilled water system, water-source heat pumps)—the Unitary DOAS conditions the outdoor ventilation air, while the primary system provides cooling or heating to balance building shell and interior loads and solar heat gain.

An industry consensus test standard has been established for a subset of Unitary DOASes, dehumidifying Unitary DOASes (DX–DOASes). On July 7, 2021, DOE published a NOPR proposing definitions, a new Federal test procedure, energy efficiency metrics, and representation requirements for DX–DOASes[7] (the ''July 2021 Test Procedure NOPR''). 86 FR 36018.

1. ASHRAE Standard 90.1 Efficiency Levels for DX–DOASes

As first established in ASHRAE Standard 90.1–2016, ASHRAE Standard 90.1–2019 specifies 14 separate equipment classes for DX–DOASes and sets minimum efficiency levels using

[4] EPCA further classifies ''commercial package air conditioning and heating equipment'' into categories based on cooling capacity (*i.e.,* small, large, and very large categories). (42 U.S.C. 6311(8)(B)–(D); 10 CFR 431.92) ''Small commercial package air conditioning and heating equipment'' means equipment rated below 135,000 Btu per hour (cooling capacity). (42 U.S.C. 6311(8)(B); 10 CFR 431.92) ''Large commercial package air conditioning and heating equipment'' means equipment rated: (i) At or above 135,000 Btu per hour; and (ii) below 240,000 Btu per hour (cooling capacity). (42 U.S.C. 6311(8)(C); 10 CFR 431.92) ''Very large commercial package air conditioning and heating equipment'' means equipment rated: (i) At or above 240,000 Btu per hour; and (ii) below 760,000 Btu per hour (cooling capacity). (42 U.S.C. 6311(8)(D); 10 CFR 431.92) DOE generally refers to these broad classifications as ''equipment types.''

[5] *See* American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1, ''Energy Standard for Buildings Except Low-Rise Residential Buildings.''

[6] Other types of dedicated outdoor air systems are available that do not utilize direct expansion (*e.g.,* units that use chilled water, rather than refrigerant, as the heat transfer medium).

[7] In the July 2021 Test Procedure NOPR, DOE refers to Unitary DOASes and DX–DOASes as DX–DOASes and DDX–DOASes, respectively. DOE has recently published a supplemental test procedure NOPR, in which DOE proposes to use the Unitary DOAS and DX–DOAS terminology. This NOPR uses the Unitary DOAS and DX–DOAS terminology, which is consistent with the supplemental test procedure NOPR.

the integrated seasonal moisture removal efficiency (ISMRE) metric for all DX–DOAS classes and also the integrated seasonal coefficient of performance (ISCOP) metric for air-source heat pump and water-source heat pump DX–DOAS classes. ASHRAE Standard 90.1–2019 specifies that both metrics are to be measured in accordance with ANSI/AHRI Standard 920–2015, ''Performance Rating of DX-Dedicated Outdoor Air System Units'' (ANSI/AHRI 920–2015). ANSI/AHRI 920–2015 specifies the method for testing DX–DOASes, in part, through a reference to ANSI/ASHRAE Standard 198–2013, ''Method of Test for Rating DX-Dedicated Outdoor Air Systems for Moisture Removal Capacity and Moisture Removal Efficiency'' (ANSI/ASHRAE 198–2013). The energy efficiency standards specified in ASHRAE Standard 90.1 are based on ANSI/AHRI 920–2015 and ANSI/ASHRAE 198–2013, and these standards are shown in Table II.1.

TABLE II.1—ASHRAE STANDARD 90.1 EFFICIENCY LEVELS FOR DX–DOASES

Equipment class	Energy efficiency levels
Air-cooled: Without energy recovery	4.0 ISMRE.
Air-cooled: With energy recovery	5.2 ISMRE.
Air-source heat pumps: Without energy recovery	4.0 ISMRE, 2.7 ISCOP.
Air-source heat pumps: With energy recovery	5.2 ISMRE, 3.3 ISCOP.
Water-cooled: Cooling tower condenser water, without energy recovery	4.9 ISMRE.
Water-cooled: Cooling tower condenser water, with energy recovery	5.3 ISMRE.
Water-cooled: Chilled water, without energy recovery	6.0 ISMRE.
Water-cooled: Chilled water, with energy recovery	6.6 ISMRE.
Water-source heat pumps: Ground-source, closed loop, without energy recovery	4.8 ISMRE, 2.0 ISCOP.
Water-source heat pumps: Ground-source, closed loop, with energy recovery	5.2 ISMRE, 3.8 ISCOP.
Water-source heat pumps: Ground-water source, without energy recovery	5.0 ISMRE, 3.2 ISCOP.
Water-source heat pumps: Ground-water source, with energy recovery	5.8 ISMRE, 4.0 ISCOP.
Water-source heat pumps: Water-source, without energy recovery	4.0 ISMRE, 3.5 ISCOP.
Water-source heat pumps: Water-source, with energy recovery	4.8 ISMRE, 4.8 ISCOP.

2. Update to the Industry Metric

As discussed in the July 2021 Test Procedure NOPR, AHRI revised AHRI 920 and published an updated version on February 4, 2020, AHRI Standard 920–2020 (I–P), ''Performance Rating of Direct Expansion Dedicated Outdoor Air System Units'' (AHRI 920–2020). 86 FR 36018, 36026. The updates to AHRI 920 include certain revised test conditions and weighting factors for ISMRE and ISCOP, which were redesignated as ISMRE2 and ISCOP2, respectively. These revisions result in the ISMRE2 and ISCOP2 metrics that more accurately reflect the actual energy use for DX–DOASes, improve the repeatability and reproducibility of the test methods, and also reduce testing burden compared to ISMRE and ISCOP. For example, the revised weighting factors reflect the number of hours per year for each test condition, and the revised test conditions are based on weather data from Typical Meteorological Year 2 (TMY2) [8] provided by the National Renewable Energy Laboratory. 86 FR 36018, 36029. A detailed discussion of the summary of the AHRI 920 updates is provide in the July 2021 Test Procedure NOPR. 86 FR 36018, 36026–36027.

The July 2021 Test Procedure NOPR proposes to add a new appendix B to subpart F of part 431, titled ''Uniform test method for measuring the energy consumption of dehumidifying direct expansion-dedicated outdoor air systems,'' that would include the new test procedure requirements for DX–DOASes. 86 FR 36018, 36022. The proposed appendix B test procedure for DX–DOASes incorporates by reference AHRI Standard 920–2020, the most recent version of the test procedure recognized by ASHRAE Standard 90.1 for DX–DOASes, and the relevant industry standards referenced therein. *Id.*

The amendments adopted in AHRI 920–2020 result in changes to the measured efficiency metrics as compared to the results under ANSI/AHRI 920–2015, which as noted above, is the test procedure used to measure DX–DOAS efficiency levels in Standard 90.1–2016 and 90.1–2019. In the July 2021 Test Procedure NOPR DOE noted that it will address any potential differences in the measured energy efficiency under the most recent industry test procedure as compared to the industry test procedure on which the ASHRAE Standard 90.1 levels are based at such time as DOE evaluates the ASHRAE Standard 90.1 levels for DX–DOASes (*i.e.,* by developing an appropriate ''crosswalk'', as necessary). 86 FR 36018, 36027.

Accordingly, because the measured energy efficiency metrics in the July 2021 Test Procedure NOPR are different from those used by the ASHRAE 90.1–2019, DOE has developed a crosswalk analysis for these proposed standards, which translates the existing ASHRAE Standard 90.1–2019 ISMRE and ISCOP standards to the new metrics proposed in the July 2021 Test Procedure NOPR. The crosswalk analysis is discussed in detail in section IV of this document.

3. History of Standards Rulemaking for DX–DOASes

On September 11, 2019—prior to the publication of AHRI 920–2020 and the July 2021 Test Procedure NOPR proposing to incorporate by reference the updated AHRI 920–2020—DOE published an analysis of new industry standards for DX–DOASes in a notice of data availability and request for information (the September 2019 NODA/RFI).[9] 84 FR 48006. The September 2019 NODA/RFI solicited information from the public to help DOE determine whether new standards for DX–DOASes at levels more stringent than specified in ASHRAE Standards 90.1 would result in significant energy savings and whether such standards would be technologically feasible and economically justified. The September 2019 NODA/RFI also presented incremental efficiency levels for air-

[8] TMY stands for ''typical meteorological year'' and is a widely used type of data available through the National Solar Radiation Database. TMYs contain one year of hourly data that best represents median weather conditions over a multiyear period. The datasets have been updated occasionally, thus TMY, TMY2, and TMY3 data are available. *See nsrdb.nrel.gov/about/tmy.html* (last accessed April 28, 2021).

[9] The September 2019 NODA/RFI also requested comment and data regarding standards for computer room air conditioners, which are being addressed in a separate rulemaking.

cooled DX–DOASes (based on the ANSI/AHRI 920–2015 metrics, ISMRE and ISCOP) and annual unit energy consumption estimates for these levels.

DOE received five comments relevant to DX–DOASes in response to the September 2019 NODA/RFI from the interested parties listed in Table II.2.

TABLE II.2—SEPTEMBER 2019 NODA/RFI WRITTEN COMMENTS

Commenter(s)	Reference in this NOPR	Commenter type
7 AC Technologies	7AC	Manufacturer.
Air-conditioning, Heating, & Refrigeration Institute	AHRI	Trade Association.
Ingersoll Rand Trane	Trane	Manufacturer.
Pacific Gas and Electric Co., San Diego Gas and Electric Co., Southern California Edison	CA IOUs	Utilities.
Pano Koutrouvelis	DU	Individual.

A parenthetical reference at the end of a comment quotation or paraphrase provides the location of the item in the public record.[10]

C. Timing of ASHRAE Test Procedures and Appendix A

Section 8(d) of 10 CFR part 430, subpart C, appendix A (''appendix A'') establishes a general principal that new test procedures and amended test procedures that impact measured energy use or efficiency should be finalized prior to the close of the comment period for a NOPR proposing new or amended energy conservation standards. DOE also noted, however, that a one-size-fits-all requirement to finalize new or amended test procedures a set number of days before issuing a proposed standard does not allow DOE to account for the particular circumstances of a rulemaking and may result in unnecessary delays. 86 FR 70920. In this instance, ASHRAE 90.1–2016 (*i.e.,* the standard which triggered DOE to establish uniform national standards for DX–DOASes) was published over six years ago, however EPCA requires DOE to establish such standards no later than 18 months following the publication of ASHRAE 90.1–2016. (42 U.S.C. 6313(a)(6)(A)(ii)(I)) DOE is proposing energy conservation standards for DX–DOASes before the current test procedure rule is finalized to accelerate DOE's efforts to meet its EPCA obligation to establish energy conservation standards. In addition, DOE notes that DOE has proposed in the July 2021 Test Procedure NOPR to incorporate by reference AHRI 920–2020, which was published roughly two years ago. Given DOE's obligation to adopt the relevant industry test procedure unless DOE determines, supported by clear and convincing evidence, that it does not produce results which reflect energy use during a representative average use cycle or is unduly burdensome to conduct (42 U.S.C. 6314(a)(2–4)), stakeholders would have had a reasonable level of confidence of the test procedure DOE would use as the basis of the proposed efficiency levels, and finalization of the test procedure rulemaking is unlikely to affect that understanding.

III. General Discussion

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

A. Scope of Coverage

As discussed in the September 2019 NODA/RFI, the inclusion of energy efficiency levels in ASHRAE Standard 90.1–2016 for DX–DOASes [11] triggered DOE to consider energy conservation standards for this type of equipment. 84 FR 48006, 48010.

As discussed in the July 2021 Test Procedure NOPR, Unitary DOASes meet the EPCA definition for ''commercial package air conditioning and heating equipment,'' and, thus, are to be considered as a category of that covered equipment (42 U.S.C. 6311(8)(A)), and the upper capacity limit of commercial package air conditioning subject to the DOE test procedures is 760,000 Btu per hour, based on the definition of ''very large commercial package air conditioning and heating equipment.'' (42 U.S.C. 6311(8)(D)) 86 FR 36018, 36023–36024. In response to the September 2019 NODA/RFI, AHRI commented that it supported a maximum capacity for regulated products that is equivalent to 760,000 Btu per hour at Standard Rating Condition A in AHRI 920. (AHRI, No. 7, p. 9) In the July 2021 Test Procedure NOPR DOE noted that for DX–DOASes, AHRI 920–2020 does not provide a method for determining capacity in terms of Btu per hour, but instead, it specifies a determination of capacity in terms of moisture removal capacity (MRC). 86 FR 36018, 36024. DOE is proposing to translate the upper capacity for coverage of commercial package air conditioning and heating units established in EPCA (*i.e.,* 760,000 Btu per hour) from Btu per hour to MRC for DX–DOASes. *Id.* The equivalent upper capacity limit proposed for DX–DOASes is 324 lbs moisture/hr at Standard Rating Condition A in AHRI 920. *Id.*

In this NOPR DOE proposes that the proposed energy conservation standards would apply to DX–DOASes with an MRC less than or equal to 324 lbs moisture/hr. This scope of coverage would be consistent with the definitions of ''Unitary DOAS'' and ''DX–DOAS'' proposed in the July 2021 Test Procedure NOPR:

(1) ''Direct expansion-dedicated outdoor air system, or Unitary DOAS, means a category of small, large, or very large commercial package air-conditioning and heating equipment which is capable of providing ventilation and conditioning of 100-percent outdoor air or marketed in materials (including but not limited to, specification sheets, insert sheets, and online materials) as having such capability'' and

(2) ''Dehumidifying direct expansion-dedicated outdoor air system, or DX–DOAS, means a direct expansion-dedicated outdoor air system that is capable of dehumidifying air to a 55 °F dew point—when operating under Standard Rating Condition A as specified in Table 4 or Table 5 of AHRI 920–2020 (incorporated by reference, see § 431.95) with a barometric pressure of 29.92 in Hg—for any part of the range of airflow rates advertised in manufacturer materials, and has a moisture removal capacity of less than 324 lb/h.''

86 FR 36018, 36057.

[10] The parenthetical reference provides a reference for information located in the docket of DOE's rulemaking to develop energy conservation standards for DX–DOASes. (Docket No. EERE–2017–BT–STD–0017, which is maintained at *www.regulations.gov*). The references are arranged as follows: (Commenter name, comment docket ID number, page of that document).

[11] The September 2019 NODA/RFI used the term ''DOAS''. *See generally* 84 FR 48006.

The CA IOUs requested that DOE clarify whether split-system DX–DOASes (with remote condenser units) are included within the scope of coverage, stating that AHRI 920 applies to both ''single package'' and ''remote condenser'' DX–DOASes. (CA IOUs, No. 6, p. 4) DOE is proposing to include split-system DX–DOASes within the scope of coverage, consistent with the scope of the ASHRAE Standard 90.1 minimum efficiency levels [12] for DX–DOASes and AHRI 920–2020. Just as split systems are included in the scope of other categories of commercial package air-conditioning and heating equipment (*e.g.,* computer room air conditioners, variable-refrigerant flow multi-split systems) DOE is proposing to include them in the scope for DX–DOASes. (*See,* for example, the definitions of ''Computer Room Air Conditioner'' and ''Variable Refrigerant Flow Multi-Split Air Conditioner'' at 10 CFR 431.92.)

B. Equipment Classes

When evaluating and establishing energy conservation standards, DOE divides covered products into product classes by the type of energy used or by capacity or other performance-related features that justify differing standards.

ASHRAE Standard 90.1–2016 created 14 separate equipment classes for DX–DOASes. EPCA generally requires DOE to establish energy conservation standards for commercial package air-conditioning and heating equipment at the minimum efficiencies set forth in ASHRAE Standard 90.1. (*See* 42 U.S.C. 6313(a)(6)(A)) DOE is proposing to establish eight DX–DOAS equipment classes that correspond to eight of the 14 classes in ASHRAE Standard 90.1—this proposal, including the omission of the remaining six classes, is discussed in the following paragraphs.

14 separate equipment classes (indicated as ''equipment types'' and ''subcategories'') were created by ASHRAE Standard 90.1–2016 and maintained in ASHRAE Standard 90.1–2019 (see Table II.1). These are differentiated by condensing type (air-cooled, air-source heat pump, water-cooled, and water-source heat pump). ASHRAE Standard 90.1 does not delineate classes for DX–DOASes based on capacity. AHSRAE Standard 90.1 does separate classes into those with ventilation energy recovery systems (VERS)—often referred to as simply ''energy recovery''—and those without VERS. The July 2021 Test Procedure NOPR proposed to include a definition for VERS at 10 CFR 431.92 that reads, ''Ventilation energy recovery system, or VERS, means a system that pre-conditions outdoor ventilation air entering the equipment through direct or indirect thermal and/or moisture exchange with the exhaust air, which is defined as the building air being exhausted to the outside from the equipment.'' 86 FR 36018, 36057.

The ASHRAE Standard 90.1 requirements for water-cooled condensing units are divided into two application conditions: Cooling tower condenser water and chilled water. The requirements for water-source heat pump units are divided into three application conditions: Ground-source closed loop, ground-water-source, and water-source. However, these application rating conditions are labeled as ''subcategories'' in ASHRAE Standard 90.1–2019. Moreover, as discussed more below, AHRI 920–2020, the update to the industry test procedure upon which the DX–DOAS efficiency ratings in Standard 90.1 are based, but which has not yet been incorporated into Standard 90.1, identifies some of these application rating conditions as optional for purposes of the test procedure.

The EPCA definition for ''commercial package air conditioning and heating equipment'' does not include ground-water-source equipment (*see* 42 U.S.C. 6311(8)(A)), therefore DOE is not considering the ground-water-source application condition for its regulated equipment classes. In response to the September 2019 NODA/RFI, the CA IOUs commented in support of the exclusion of ground-water-source equipment from the regulated equipment classes. (CA IOUs, No. 6, p. 4)

In the September 2019 NODA/RFI, DOE requested comment on the approach of evaluating water-cooled DX–DOASes as a single category (with classes still disaggregated by those models with and without VERS) using the specified cooling tower condenser water entering temperature conditions, and evaluating water-source heat pump DX–DOASes as a single category (with classes still disaggregated by those models with and without VERS) using only the specified water-source inlet fluid temperature conditions. 84 FR 48006, 48021–48022. As part of its analysis for the September 2019 NODA/RFI, DOE considered whether to evaluate separately the two water-cooled DOAS classes or whether the water-cooled cooling tower condenser water classes and the water-cooled chilled water classes should be grouped together and represented as water-cooled DOASes (with classes still disaggregated by those models with energy recovery and those models without energy recovery). DOE also considered whether to evaluate separately the two remaining water-source heat pump classes or whether the water-source heat pump ground-source closed loop classes and the water-source heat pump water-source classes should be grouped together and represented as water-source heat pump DOASes (with classes still disaggregated by those models with energy recovery and those models without energy recovery). 84 FR 48021.

Based on DOE's review of equipment specifications of water-cooled and water-source heat pump DOASes and comments on the concurrent test procedure evaluation, DOE determined that most water-cooled DOASes use the same equipment for different applications and that water-source heat pump DOASes use the same equipment design for different applications. DOE stated that it is not aware of water-cooled DOAS units that are exclusively designed for use with cooling tower or chilled water. Likewise, DOE stated that it is not aware of water-source heat pump DOAS units that are exclusively designed for use with water-source or ground-source closed-loop applications. It is also DOE's understanding that ASHRAE Standard 90.1 efficiency levels are different across comparable classes within the water-cooled condensing type (*e.g.,* comparing energy recovery classes to energy recovery classes) and across comparable classes within the water-source condensing type because of the different test/application conditions, as opposed to equipment design differences. For example, when testing a DOAS to obtain a water-cooled chilled water DOAS rating, a colder condenser water entering temperature is used than when testing it to obtain a water-cooled cooling tower DOAS rating, reflecting the typically cooler temperature of chilled water loops in commercial buildings, as compared with cooling tower water loops. *Id.*

As a result, in the September 2019 NODA/RFI, DOE combined the water-cooled cooling tower condenser water classes and the water-cooled chilled water classes and evaluated water-cooled DOASes as a single set of classes (with classes disaggregated by those models with energy recovery and those models without energy recovery) that is subject to a single set of operating conditions. DOE also combined the water-source heat pump ground-source closed loop classes and the water-source heat pump water-source classes and

[12] Tables 6.8.1–13 and 6.8.1–14 of ASHRAE Standard 90.1–2019 indicates that it provides minimum efficiency levels for ''Electrically Operated DX–DOAS Units, Single-Package and Remote Condenser.''

evaluated the water-source heat pump DOASes as a single set of classes (with classes still disaggregated by those models with energy recovery and those models without energy recovery) that is subject to a single set of operating conditions. AHRI, the CA IOUs, and Trane commented in support of this proposed approach. (AHRI, No. 7, p. 9; CA IOUs, No. 6, p. 4; Trane, No. 5, p. 3)

In the July 2021 Test Procedure NOPR, DOE noted that AHRI 920–2020 still provides separate inlet fluid rating conditions for the different water-cooled and water-source heat pump DX–DOAS applications but identifies the chilled water conditions and ground-source closed loop conditions as optional application rating conditions. 86 FR 36018, 36033. On this topic, AHRI commented that in almost all cases, a single design is used for water-cooled equipment used with cooling tower water and chilled water, and, similarly, a single design is used for all of the water-source applications, adding that for each of these cases, a single set of water conditions can be used for testing. *Id.* Section 2.2.1(c)(i) of the proposed appendix B test procedure specifies the use of the ''Condenser Water Entering Temperature, Cooling Tower Water'' conditions for rating water-cooled DX–DOASes and the ''Water-Source Heat Pumps'' conditions for rating water-source heat pump DX–DOASes. 86 FR 36018, 36060. DOE stated in the July 2021 Test Procedure NOPR that it would consider establishing standards and the corresponding certification requirements in the context of these inlet fluid temperature conditions. 86 FR 36018, 36033.

Based on its review and feedback from stakeholders, DOE has determined that separate equipment classes for each one of these subcategories in the proposed standards is not necessary, and that the 8 proposed equipment classes are most representative of DX–DOAS equipment and rating applications in the field. DOE understands that the water-cooled equipment ''subcategories'' in ASHRAE Standard 90.1–2019 are meant to represent different application requirements for the same equipment, and thus DOE's proposed equipment class structure does not split water-cooled equipment into cooling tower water and chilled water subcategories. As proposed, all water-cooled equipment would be rated to the cooling tower water conditions, and standards would be established for water-cooled DX–DOASes with and without VERS. Similarly, the equipment class structure DOE is proposing does not split water-source heat pump equipment into the three subcategories in ASHRAE Standard 90.1–2019. Because of the statutory exclusion of ground-water-source equipment and because ground-source closed loop conditions are optional to test to in AHRI 920–2020, all water-source heat pump equipment would be rated to the water-source heat pump water conditions, and standards would be established for water-source heat pump DX–DOASes with and without VERS. This approach is consistent with other commercial package air conditioning and heating equipment. For example, water-source heat pumps include application test conditions for water-loop, ground-water, and ground-loop heat pumps, but DOE only requires that equipment be rated using the water-loop conditions (see Table 3 to 10 CFR 431.97). This approach avoids testing under multiple application conditions for a single equipment design. In addition, even if tested at different application conditions because the DOAS equipment uses a single design, it is expected that the relative ranking of equipment efficiency would be the same.

7AC commented that DX–DOASes with liquid desiccant heat exchangers (LDHXs) and variable-speed compressors may achieve high ISMRE efficiencies and recommended the addition of a new category with a minimum ISMRE of 7 that covers packaged units with and without exhaust air. (7AC, No. 4, p. 1) DOE understands that liquid-to-air transfer membranes can improve dehumidification efficiency when coupled with standard air conditioners. This technology uses porous membranes with liquid desiccants to absorb water vapor from the supply air stream. In its review of LDHX DX–DOASes, DOE has initially determined that this equipment would be covered under the definition of ''relief-air-cooled DX–DOAS'' in Section 3.6.2 of AHRI 920–2020 (which is incorporated into section 2.2.1(a) of the proposed appendix B test procedure) due to the way in which building return air is typically used to regenerate the liquid desiccant and cool the condenser in the refrigeration cycle. This definition specifically classifies relief-air-cooled units under the air-cooled equipment category. Furthermore, DX–DOASes with exhaust air streams are generally also included within the air-cooled equipment category demarcated in AHRI 920–2020, thus DOE is not proposing to create a separate equipment class for LDHX DX–DOASes or DX–DOASes with exhaust air.

DOE is proposing energy conservation standards for eight DX–DOASes equipment classes, consistent with the classes provided in ASHRAE Standard 90.1 as discussed above and shown in Table III.1.

TABLE III.1—PROPOSED EQUIPMENT CLASSES FOR DX–DOASES

Equipment class in ASHRAE Standard 90.1	Proposed equipment class in Federal Energy Conservation Standards
Air-cooled: Without energy recovery	(AC)—Air-cooled without ventilation energy recovery systems.
Air-cooled: With energy recovery	(AC w/VERS)—Air-cooled with ventilation energy recovery systems.
Air-source heat pumps: Without energy recovery	(ASHP)—Air-source heat pumps without ventilation energy recovery systems.
Air-source heat pumps: With energy recovery	(ASHP w/VERS)—Air-source heat pumps with ventilation energy recovery systems.
Water-cooled: Cooling tower condenser water, without energy recovery	(WC)—Water-cooled without ventilation energy recovery systems.
Water-cooled: Cooling tower condenser water, with energy recovery	(WC w/VERS)—Water-cooled with ventilation energy recovery systems.
Water-source heat pumps: Water-source, without energy recovery	(WSHP)—Water-source heat pumps without ventilation energy recovery systems.
Water-source heat pumps: Water-source, with energy recovery	(WSHP w/VERS)—Water-source heat pumps with ventilation energy recovery systems.

Issue–1: DOE requests comment on the proposed eight equipment classes for energy conservation standards of DX–DOASes.

C. 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 products 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.

DOE does not currently have test procedures or energy conservation standards established for DX–DOASes. In response to the September 2019 NODA/RFI, AHRI indicated that it strongly agreed with DOE's tentative conclusion that DOE's existing test procedures are not appropriate for DX–DOAS units. (AHRI, No. 7, p. 7)

ASHRAE Standard 90.1–2019 references ANSI/AHRI 920–2015, which relies on the metrics of ISMRE and ISCOP, and the standards for DX–DOASes in ASHRAE Standard 90.1–2019 are in terms of ISMRE and ISCOP. ANSI/AHRI 920–2015 was superseded with the publication of AHRI 920–2020, which relies on the updated metric ISMRE2 and ISCOP2.

The July 2021 Test Procedure NOPR proposes a new Federal test procedure for DX–DOASes that would incorporate AHRI 920–2020, which is the most recent version of the test procedure recognized by ASHRAE Standard 90.1 for DX–DOASes. 86 FR 36018, 36022. The proposed test procedure incorporates AHRI 920–2020 in its entirety, with certain minor clarifications DOE has preliminarily determined would be consistent with the industry test procedure. 86 FR 36018, 36047. AHRI 920–2020 specifies Standard Rating Conditions (*i.e.,* controlled operating conditions) with instructions for instrumentation, test set-up, tolerances, method of test, and calculations of capacity and efficiency. The proposed DOE test procedure would establish ISMRE2 as the dehumidification efficiency metric for all DX–DOASes and ISCOP2 as the heating efficiency metric for heat pump DX–DOASes. 86 FR 36018, 36027–36029. DOE is proposing to define ISMRE2 and ISCOP2 consistent with AHRI 920–2020. *Id.*

AHRI commented that, among other things, the current version of AHRI 920 transitions the efficiency metrics for DX–DOASes from ISMRE and ISCOP to ISMRE2 and ISCOP2. AHRI stated that two major differences between ISMRE and ISMRE2 are: With the new metric, DX–DOASes will no longer be required to reheat conditioned air to space-neutral conditions (70–75 °F supply air), and excess dehumidification beyond the design supply air dew point is no longer credited at part-load conditions. AHRI commented that the heating metric changes are similar: The heating coefficient of performance is now determined at the staging that most closely provides a supply air temperature within the allowable range. AHRI also noted that two new application rating metrics were added in AHRI 920–2020: $ISMRE2_{70}$ and $COP_{DOAS,x}$. Additionally, AHRI commented that new provisions have been included in AHRI 920–2020 for the testing and performance calculations of DX–DOASes with VERS. (AHRI, No. 7, p. 8–9)

The CA IOUs raised the concern that a dehumidification efficiency metric may not be appropriate for DX–DOASes based on an analysis showing that, on a national shipment-weighted basis, the outdoor air dew point is above 55 °F [13] only 36.7 percent of the time; therefore, the CA IOUs suggested that DOE consider adjustments to the DX–DOAS test procedure that contribute to a standard that reflects sensible cooling and/or fan-only ventilation conditions. The CA IOUs did not dispute that the primary use-case of a DX–DOAS system is to cool and dehumidify outdoor air, however they claim not all installation locations will have dehumidification requirements as aggressive as the tested conditions required for an ISMRE rating. (CA IOUs, No. 6, p. 6)

DOE addressed this subject in the July 2021 Test Procedure NOPR (*see* 86 FR 36027). In particular, DOE received comments from AHRI stating that DX–DOASes are installed with separate complementary sensible-cooling-only systems that provide cooling to address the interior loads, and that adding sensible cooling to the metric for DX–DOAS would skew efficiency values toward the non-primary function of the DX–DOAS. This focus of DX–DOAS performance on dehumidification loads supports DOE's proposal to adopt the ISMRE2 dehumidification efficiency metric in AHRI 920–2020. 86 FR 36018, 36027. Nevertheless, the sensible cooling provided by a DX–DOAS unit may be valuable in many applications because it reduces the cooling that must be provided by interior cooling systems, especially at high outdoor temperatures. DOE may consider in a future rulemaking whether the efficiency metric should be revised to include sensible cooling; however, EPCA prescribes that the test procedures for commercial package air conditioning and heating equipment must be those generally accepted industry testing procedures or rating procedures developed or recognized by industry as referenced in ASHRAE Standard 90.1 (*i.e.,* AHRI 920 for DX–DOASes). (42 U.S.C. 6314(a)(4)(A))

The July 2021 Test Procedure NOPR discusses major updates to the AHRI 920 test procedure, as well as the efficiency metrics, in depth. 86 FR 36018, 36025–36045. DOE is addressing comments regarding specific aspects of the proposed test procedure in the concurrent test procedure rulemaking.

In this NOPR, DOE is proposing to establish energy conservation standards for DX–DOASes in terms of ISMRE2 and ISCOP2.

D. Considerations for Energy Conservation Standards

In this proposed rulemaking to establish energy conservation standards for DX–DOASes, DOE is proposing to adopt ISMRE2 and ISCOP2 minimum efficiency levels of equivalent stringency to the ISMRE and ISCOP minimum efficiency levels currently published in ASHRAE Standard 90.1.

As discussed in section II.A of this document, EPCA requires DOE to amend the existing Federal energy conservation standard for covered equipment each time ASHRAE amends [14] Standard 90.1 with respect to such equipment. (42 U.S.C. 6313(a)(6)(A)) When triggered in this manner, DOE must adopt the minimum level specified in the amended ASHRAE Standard 90.1, unless DOE determines that there is clear and convincing evidence to support a determination that a more stringent standard level would produce significant additional conservation of energy and be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)) If DOE makes such a determination, it must publish a final rule to establish the more stringent standards. (42 U.S.C. 6313(a)(6)(B)) DOE

[13] AHRI 920–2020 requires that DX–DOASes dehumidify outdoor ventilation air to a maximum dew point of 55 °F as a representative set point for dehumidified building supply air. Therefore, if the outdoor air dew point temperature is below 55 °F, there would typically not be any dehumidification load on the DX–DOAS, and the remaining cooling load would be for sensible cooling only.

[14] Although EPCA does not explicitly define the term ''amended'' in the context of what type of revision to ASHRAE Standard 90.1 would trigger DOE's obligation, DOE's longstanding interpretation has been that the statutory trigger is an amendment to the standard applicable to that equipment under ASHRAE Standard 90.1 that increases the energy efficiency level for that equipment. *See* 72 FR 10038, 10042 (March 7, 2007).

states in Section 9(b) of Appendix A to subpart C of part 430 that clear and convincing evidence would exist only where the specific facts and data made available to DOE regarding a particular ASHRAE amendment demonstrate that there is no substantial doubt that a standard more stringent than that contained in the ASHRAE Standard 90.1 amendment is permitted because it would result in a significant additional amount of energy savings, is technologically feasible and economically justified.

DOE normally performs multiple in-depth analyses to determine whether there is clear and convincing evidence to support more stringent energy conservation standards (*i.e.,* whether more stringent standards would produce significant additional conservation of energy and be technologically feasible and economically justified). Table III.2 shows the statutory requirements and DOE's corresponding analytical approach, including DOE's approach to the seven-factor analysis for determining whether a standard is economically justified.

TABLE III.2—EPCA REQUIREMENTS AND CORRESPONDING DOE ANALYSIS

EPCA requirement	Corresponding DOE analysis
Significant Energy Savings	• Shipments Analysis. • National Impact Analysis. • Energy Use Determination.
Technological Feasibility	• Market and Technology Assessment. • Screening Analysis. • Engineering Analysis.
Economic Justification:	
1. Economic Impact on Manufacturers and Consumers	• Manufacturer Impact Analysis. • Life-Cycle Cost and Payback Period Analysis. • Life-Cycle Cost Subgroup Analysis.
2. Lifetime Operating Cost Savings Compared to Increased Cost for the Product	• Shipments Analysis. • Markups for Product Price Determination. • Energy and Water Use Determination. • Life-Cycle Cost and Payback Period Analysis.
3. Total Projected Energy Savings	• Shipments Analysis. • National Impact Analysis.
4. Impact on Utility or Performance	• Screening Analysis. • Engineering Analysis.
5. Impact of Any Lessening of Competition	• Manufacturer Impact Analysis.
6. Need for National Energy and Water Conservation	• Shipments Analysis. • National Impact Analysis.
7. Other Factors the Secretary Considers Relevant	• Employment Impact Analysis. • Utility Impact Analysis. • Emissions Analysis. • Monetization of Emission Reductions Benefits. • Regulatory Impact Analysis.

DOE received comments from DU regarding the EPCA seven-factor test and the analytical framework for establishing energy conservation standards. DU commented that the sixth factor for economic justification, ''need for national energy and water conservation,'' is too broad and should specify a goal for savings by the year the amended standards go into effect. DU also requested clarification on whether the analytical methods used to determine national energy savings are limited to a cross-sectional analysis and if so, the rationale behind eliminating the time series. (DU, No. 3, p. 1) DOE notes that the seven factors in EPCA were specified by Congress. Regarding the national energy savings (NES), DOE notes that it is not a cross-sectional analysis. In the September 2019 NODA/RFI, a 30-year time series of shipments was used to calculate the NES for DX–DOASes.

As previously described, DOE normally conducts the analysis depicted in Table III.2 to determine whether clear and convincing evidence supports more stringent energy conservation standards. In this instance, however, DOE has tentatively determined that a lack of data precludes such an analysis and therefore precludes a finding of clear and convincing evidence. DOE provided a technical support document (TSD) [15] with the September 2019 NODA/RFI to present initial findings for certain of these analyses for DX–DOASes. Chapter 4 of the September 2019 NODA/RFI TSD discusses DOE's detailed methodology for estimating national energy savings. When DOE conducts a national energy savings analysis, it calculates the cumulative energy savings over the analysis period by summing the annual energy savings for each year in the analysis period, thereby considering the long-term impacts—as opposed to a limited cross-section of time. However, as described in the following subsections, DOE does not have sufficient data to revise and expand upon these analyses presented in the TSD at this time.

[15] The September 2019 NODA/RFI TSD is available as Document No. 2 at *www.regulations.gov/docket/EERE-2017-BT-STD-0017.*

1. Technological Feasibility

a. General

To evaluate whether more stringent standards than those in the updated ASHRAE Standard 90.1 would be technologically feasible, DOE generally first conducts a market and technology assessment to survey all current technology options in products on the market and prototype designs that could improve the efficiency of the subject equipment. DOE then conducts a screening analysis based on information gathered on all current technology options and prototype designs that could improve the efficiency of the products or equipment that are the subject of the rulemaking. As the first step in such an analysis, DOE develops a list of technology options for consideration in consultation with manufacturers, design engineers, and other interested parties. DOE then determines which of those means for improving efficiency are technologically

feasible. DOE considers technologies incorporated in commercially-available products or in working prototypes to be technologically feasible. *See generally* 10 CFR 431.4; 10 CFR part 430, subpart C, appendix A, sections 6(c)(3)(i) and 7(b)(1).

After DOE has determined that particular technology options are technologically feasible, it further evaluates each technology option in light of the following additional screening criteria: (1) Practicability to manufacture, install, and service; (2) adverse impacts on product utility or availability; (3) adverse impacts on health or safety, and (4) unique-pathway proprietary technologies. *See generally* 10 CFR 431.4; 10 CFR part 430, subpart C, appendix A, sections 6(c)(3)(ii)–(v) and 7(b)(2)–(5).

DOE is not aware of an existing database or compilation containing a comprehensive list of DX–DOAS models and performance metrics. As noted, DX–DOASes are not currently subject to Federal energy conservation standards, and so manufacturers of DOASes are not required to certify or report to DOE the energy efficiency of such equipment. The AHRI Directory does not currently list DX–DOAS equipment performance ratings. Similarly, DOE was not able to find ISMRE or ISCOP ratings in much of the manufacturer equipment specifications. It is unclear to what extent the market has responded to the industry standards initially specified in ASHRAE Standard 90.1–2016.

Also as discussed, in the edition of AHRI 920 immediately following the edition in which an industry testing standard was established for DOAS, AHRI adopted updated metrics for DX–DOASes (*i.e.,* ISMRE2 and ISCOP2). Similarly, DOE was not able to find ISMRE2 or ISCOP2 ratings in much of the manufacturer equipment specifications. Because this test procedure was fairly recently published, it is not clear to what extent the test data has been developed based on the updated industry testing standard (*i.e.,* AHRI 920–2020), although DOE expects that this test procedure represents the industry consensus for testing DX–DOASes.

In the September 2019 NODA/RFI, DOE analyzed two incremental efficiency levels (ELs) above the ASHRAE Standard 90.1 minimum ISMRE efficiency levels for air-cooled DX–DOASes (with and without VERS) based on technology options that are expected to be available for DX–DOASes. 84 FR 48006, 48026. The ELs were also based, in part, on an initial assessment of EER data for commercial unitary air conditioners due to the lack of market data using the AHRI 920 performance metrics. 84 FR 48006, 48026. DOE tentatively determined based on manufacturer feedback that the baseline design would likely include staged compressors, and that the design change from the baseline efficiency level (the ASHRAE Standard 90.1 minimum) to EL 1 would involve changing from staged compressor operation to variable-capacity digital scroll compressors. The design changes from EL 1 to EL 2 include increasing the condenser heat exchanger size and fin density, increasing the total condenser fans horsepower, and reducing the capacity of the compressors needed. Due to the similarity in designs, DOE considered that the same technology options and resulting increase in efficiency from the analysis for DX–DOASes without VERS would be applied for DX–DOASes with VERS. *Id.*

The CA IOUs commented that the analysis should take into account all equipment classes of DX–DOAS because, while air-cooled DX–DOASes may comprise the vast majority of DX–DOAS shipments, there are other equipment classes with the potential for energy savings. (CA IOUs, No. 6, p. 6) The CA IOUs also disagreed with the efficiency level distribution and asked DOE to develop a more sophisticated efficiency analysis. (CA IOUs, No. 6, p. 7) AHRI also disagreed with DOE's incremental efficiency levels because they were derived from a single manufacturer's equipment at a single capacity size. (AHRI, No. 7, p. 8) The CA IOUs urged DOE to conduct a cost-effectiveness analysis for new DX–DOAS standards and apply the experience curve methodology DOE recommended in 2011 [16], including both price decline to-date and a forecast of continued price decline, in order to avoid overestimating the true costs of efficiency improvements. (CA IOUs, No. 6, pp. 7–8) AHRI provided confidential business data containing limited estimations of the ISMRE ranges for DX–DOASes by cooling capacity (in Btu/hr) and disaggregated by VERS (without distinguishing between the 8 DX–DOAS equipment classes), as noted in AHRI's public comment. (AHRI, No. 7, p. 10)

DOE acknowledges that the efficiency levels for air-cooled DX–DOASes presented in the September 2019 NODA/RFI may not be representative of the DX–DOAS market because they were derived from a very limited amount of publicly available data, and additionally, these efficiency levels are no longer in terms of the metrics DOE is proposing to regulate. In this NOPR, DOE has tentatively determined that this type of engineering analysis cannot be completed due to the lack of available market and performance data. A lack of performance data using the ISMRE2 and ISCOP2 metrics impedes DOE's ability to correlate efficiency levels to DX–DOAS design options, and AHRI's data did not provide further details for this aspect of the analysis. As a result, the development of cost-efficiency curves is not possible at this time.

AHRI commented that the efficiency benefits of employing variable-capacity digital scroll compressors were overestimated in the September 2019 NODA/RFI analysis, and that this technology option is implemented primarily for control purposes. AHRI stated that while a digital scroll compressor provides capacity control, it does not provide an efficiency increase over three- or four-step compressor control, and, furthermore, a digital scroll compressor would provide a modest improvement over a single- or two-step DX–DOASes based on the equipment cycling. AHRI also asserted that DX–DOASes with single- or two-step staging do not provide the necessary control consumers require, and so they are rarely purchased. (AHRI, No. 7, p. 10) Trane also commented that the benefits of digital scroll compressors are more closely correlated to staging control than efficiency. (Trane, No. 5, p. 3)

Both AHRI and Trane commented that there is considerable variation in the technology options that may be utilized at the baseline efficiency level. (AHRI, No. 7, p. 10; Trane, No. 5, p. 3) However, AHRI generalized that small equipment (below 10 tons) utilize two-stage or digital compressors, without inverter control, with small heat exchangers; and above 10 tons, equipment typically utilizes four-stage or digital compressors, without inverter control, with larger heat exchangers. (AHRI, No. 7, p. 10) AHRI stated that for the purposes of the technology analysis, industry would support the first step to improving energy efficiency being the addition of inverter control, and the second step being including a larger condenser with more surface area. (*Id*). Additionally, the CA IOUs provided that DX–DOAS heat exchangers tend to be larger than those in typical commercial unitary air conditioners. (CA IOUs, No. 6, p. 7)

DOE appreciates these comments on technology options and has incorporated this feedback into aspects of the crosswalk analysis. DOE included

[16] In 2011, DOE published a notice of data availability discussing the experience curve methodology. 76 FR 9696 (Feb. 22, 2011).

DX–DOASes with two stages of capacity and digital scroll compressors in its ISMRE-to-ISMRE2 crosswalk analysis. Additionally, the technology options referenced by AHRI were used in DOE's analytical modeling of baseline heat pump DX–DOASes to evaluate the impact of the test procedure changes for the heating efficiency metric. DOE has initially determined that the proposed ISCOP2 standards for heat pump DX–DOASes are technologically feasible because DOE performed the ISCOP-to-ISCOP2 crosswalk based on the baseline technology options recommended by stakeholders—*i.e.,* staged scroll compressors, no inverter control, and representative baseline heat exchangers for DX–DOASes. This is discussed in section IV.C.2 of this NOPR.

As discussed in section III.B of this NOPR, 7AC indicated that combining a variable-speed compressor with an economically-sized LDHX can result in an ISMRE of 7.5 without VERS and an ISMRE of 8.5 with VERS. (7AC, No. 4, p. 1) Because DOE could not identify any other manufacturers of DX–DOASes which employ LDHXs in commercially-distributed equipment, and DOE expects that this technology option utilizes proprietary technology that represents a unique pathway to achieving a particular efficiency level. For this reason, DOE did not consider LDHX technology in its analysis of whether more stringent standards would be technologically feasible or as part of the crosswalk analysis.

Issue–2: DOE continues to seek information that may inform a market and technology assessment for the DX–DOAS industry, including data on technology options which may increase the ISMRE2 and/or ISCOP2 efficiencies of DX–DOASes.

b. Maximum Technologically Feasible Levels

When evaluating more stringent standards, DOE typically must determine the maximum improvement in energy efficiency or maximum reduction in energy use that is technologically feasible for such product. (*See* 42 U.S.C. 6313(a)(6)(A)(ii)(II)) Accordingly, in the engineering analysis, DOE typically determines the maximum technologically feasible (''max-tech'') improvements in energy efficiency using the design parameters for the most efficient equipment available on the market or in working prototypes.

Prior to the publication of AHRI 920–2020, the September 2019 NODA/RFI DOE estimated that the max-tech efficiency for air-cooled DX–DOASes without VERS was an ISMRE of 6.0, whereas for air-cooled DX–DOASes with VERS the max-tech efficiency was an ISMRE of 7.2. 84 FR 48006, 48026. In response, the CA IOUs provided data that showed the range of manufacturer-published ISMRE ratings reached a maximum of 8.9 ISMRE for air-cooled DX–DOASes without VERS and 10.8 ISMRE for air-cooled DX–DOASes with VERS. (CA IOUs, No. 6, p. 7)

As discussed, DOE has proposed to incorporate by reference AHRI 920–2020 in its test procedure, which relies on different metrics than what were presented in the September 2019 NODA/RFI and what were provided by commenters. As discussed further in section IV.B.1 of this NOPR, the DX–DOAS designs that are likely to yield the highest ISMRE and ISCOP efficiencies under the ANSI/AHRI 920–2015 test procedure are not likely to yield the highest ISMRE2 and ISCOP2 efficiencies under AHRI 920–2020 (and the proposed DOE test procedure) due to significant differences in the test procedures, and therefore DOE cannot rely on ISMRE/ISCOP efficiency ratings alone (*i.e.,* without knowledge of the specific design options utilized) to identify max-tech efficiencies using the proposed test procedure.

Due to the lack of data in terms of AHRI 920–2020 efficiency metrics, DOE is currently unable to identify the most efficient equipment available on the market in terms of the proposed metrics. As such, DOE is unable to estimate the field-installed energy use and cost of the most efficient equipment (in terms of the proposed metrics) available on the market (factoring in parameters such as price markups, installation application, life-cycle cost and payback period, and overall shipments). Hence, DOE was unable to evaluate the technological feasibility of standards more stringent than the levels in the updated ASHRAE Standard 90.1.

2. Significant Additional Conservation of Energy

The ''significant additional conservation of energy'' language in 42 U.S.C. 6313(a)(6)(A) indicates that Congress 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. *See* 85 FR 8626, 8666–8667.

In determining whether energy savings are significant, DOE considers the specific circumstances surrounding a given rulemaking.[17] In making this determination, DOE looks at, among other things, the FFC effects of the proposed standards. These effects include the energy consumed in electricity production (depending on load shape), in distribution and transmission, and in extracting, processing, and transporting primary fuels (*i.e.,* coal, natural gas, petroleum fuels), and thus present a more complete picture of the impacts of energy conservation standards, including greenhouse gas emissions.

DOE has initially determined that there is insufficient data on the developing DX–DOAS market to conduct an analysis of potential energy savings resulting from more stringent standards. AHRI 920–2020 is a relatively recent industry test standard, published in February 2020, and thus AHRI has not yet established a certification database listing DX–DOAS ISMRE2 and ISCOP2 ratings. In the September 2019 NODA/RFI DOE also noted that the AHRI Directory does not list DX–DOAS equipment performance ratings, and that DOE was not able to find ISMRE or ISCOP ratings in much of the manufacturer equipment specifications. 84 FR 48006, 48026. DOE requested data on the market efficiency distribution, field installation applications and performance, the determination of unit energy consumption (UEC), equipment lifetimes, and shipments (*see* 84 FR 48006, 48036); however, DOE did not receive sufficient information with regards to these aspects of its analysis in order to determine the energy savings of more stringent efficiency levels for each of the 8 proposed DX–DOAS equipment classes.

3. Economic Justification

As noted previously, EPCA provides seven factors to be considered in determining whether standard levels more stringent than the levels specified in the updated ASHRAE Standard 90.1 are economically justified. (42 U.S.C. 6313(a)(6)(B)(ii)(I)–(VII)) The following sections provide an overview of each of those seven factors and consideration of the factors in this NOPR.

[17] Procedures, Interpretations, and Policies for Consideration in New or Revised Energy Conservation Standards and Test Procedures for Consumer Products and Commercial/Industrial Equipment, 86 FR 70892, 70901 (Dec. 13, 2021).

a. Economic Impact on Manufacturers and Consumers

In determining the impacts of a potential standard on manufacturers, DOE typically conducts a manufacturer 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) INPV, 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. Second, DOE analyzes and reports the impacts on different types of manufacturers, including impacts on small manufacturers. Third, DOE considers the impact of standards on domestic manufacturer employment and manufacturing capacity, as well as the potential for standards to result in plant closures and loss of capital investment. Finally, DOE takes into account cumulative impacts of various DOE regulations and other regulatory requirements on manufacturers.

For individual consumers, measures of economic impact include the changes in life-cycle costs (LCC) and the payback period (PBP) associated with new or amended standards. For consumers in the aggregate, DOE also calculates the national net present value 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.

As noted, DOE is unaware of any database or compilation containing a comprehensive list of DX–DOAS models and performance metrics. This presents significant challenges to performing an accurate assessment of the DX–DOAS industry structure.

DOE normally uses projections of annual equipment shipments to calculate the national impacts of potential amended or new energy conservation standards on energy use, industry net present value (NPV), and future manufacturer cash flows. The shipments model typically takes an accounting approach, tracking market shares of each product class and the vintage of units in the stock. Stock accounting uses product shipments as inputs to estimate the age distribution of in-service product stocks for all years. The age distribution of in-service product stocks is a key input to calculations of both the national energy savings and NPV because operating costs for any year depend on the age distribution of the stock.

For the September 2019 NODA/RFI, DOE developed DX–DOAS shipments estimates based on manufacturer feedback that shipments in 2016 were around 36,000 units and that DX–DOAS growth is expected to be similar to that of variable refrigerant flow multi-split system equipment. 84 FR 48006, 48030. A report by the Cadeo Group estimated variable refrigerant flow multi-split system equipment shipments to have double-digit growth through 2022. Therefore, to project shipments past 2016, DOE used a 10-percent growth rate through 2022 and then followed the same growth rate as other commercial unitary air-conditioning equipment, basing that growth rate on the reference case shipment projections in the National Impact Analysis spreadsheet from the January 15, 2016 direct final rule for commercial unitary air conditioners and heat pumps and commercial warm air furnaces (81 FR 2420). *Id.*

Manufacturers estimated that air-cooled DX–DOASes represent 95 percent of all DX–DOAS shipments, and DOE assumed that this percentage would remain constant for the duration of the 30-year shipments analysis. *Id.* For the September 2019 NODA/RFI, DOE only analyzed the two air-cooled DX–DOAS equipment classes, and so reduced the annual shipments projections developed above by 5 percent to capture only the air-cooled product classes. *Id.* DOE allocated 59-percent of shipments to air-cooled DOAS without energy recovery and 41-percent of shipments to air-cooled DOAS with energy recovery, based on manufacturer estimates of the breakdown by equipment class. *Id.*

In response, the CA IOUs provided an analysis of an online database of construction projects called ConstructConnect Insight, which suggests that DX–DOAS shipments have been increasing at an 18% annual rate since 2012. (CA IOUs, No. 6, p. 5) Additionally, the CA IOUs agreed that variable refrigerant flow and water-source heat pump systems are a good starting point for estimating DX–DOAS shipments but encouraged DOE to take into account radiant cooling, PTAC, and fan-coil installation projects as well. (*Id.*) AHRI suggested that DX–DOASes can also be paired with chilled beams and room fan coils. (AHRI, No. 7, p. 11) Trane suggested that DOE may have significantly overstated the DX–DOAS market in the September 2019 NODA/RFI. (Trane, No. 5, p. 3) AHRI provided a similar statement, specifically indicating that the 2016 shipments value for DX–DOAS was overestimated. (AHRI, No. 7, pp. 10–11) AHRI also noted that significant DX–DOAS shipment volume is relatively new to the market. (*Id.*) AHRI submitted confidential business data containing shipments estimates for DX–DOASes.

DOE acknowledges that DX–DOASes are paired with many types of space conditioning systems and that while most DX–DOASes are installed with variable refrigerant flow and water source heat pumps, other systems such as chilled beams, package terminal systems, and fan coils are paired with DX–DOASes. The confidential data submission from AHRI provided a time series of DX–DOAS shipments from 2010 to 2018. The time series provides the total number of DX–DOAS shipments along with estimates of the market share by equipment capacity and the availability of units with VERS, and this would allow DOE to improve its shipments projections. However, the shipments data does not break the shipments down by equipment class. DOE received no comments regarding the estimate that air-cooled DX–DOASes represent 95 percent of shipments or on the breakdown of DX–DOAS with and without VERS. However, DOE still lacks the breakdown of shipments for the other equipment classes. As stated earlier in this section, the shipments model is used to measure the national impacts of potential amended or new energy conservation standards. Without an engineering analysis (*see* section III.D.2.c of this document) and an energy use analysis (*see* section III.D.2.d of this document), DOE is unable to produce the other inputs necessary to project the national impact of standards more stringent than those in ASHRAE Standard 90.1–2019. Therefore DOE did not update the shipments model for this NOPR.

Were DOE to establish standards as proposed, as well as accompanying certification requirements, this information would become more readily available should DOE consider amending standards for DX–DOASes in any future rulemaking.[18] Chapter 2 of

[18] In situations where ASHRAE has not acted to amend the levels in Standard 90.1 for the equipment types enumerated in the statute, EPCA provides for a 6-year-lookback to consider the potential for amending the uniform national standards. (42 U.S.C. 6313(a)(6)(C)) Specifically, pursuant to the amendments to EPCA under the American Energy Manufacturing Technical Corrections Act (Pub. L. 112–210 (Dec. 18, 2012)), DOE is required to conduct an evaluation of each class of covered equipment in ASHRAE Standard

the September 2019 NODA/RFI TSD presents DOE's market assessment to the extent that DOE was able to retrieve publicly accessible information for DX–DOASes. Since the September 2019 NODA/RFI, DOE has, identified additional manufacturers of DX–DOASes, and these manufacturers are listed in Table III.3 (which supersedes Table 2.3 in the September 2019 NODA/RFI TSD).

TABLE III.3—MANUFACTURERS OF DX–DOASES

Manufacturers	AHRI member
AAON	Yes.
AnnexAir	No.
Daikin	Yes.
Greenheck	Yes.
Ingersoll Rand	Yes.
Johnson Controls	Yes.
Madison Industries	Yes.
Modine Manufacturing Company	Yes.
Multistack	Yes.
Munters Group AB	No.
Nortek Global HVAC	Yes.
Soler and Palau Industries	Yes.

DOE did not perform an MIA for this rulemaking because there is not enough information available on the DX–DOAS market to determine which entities are already compliant with the proposed energy conservation standards (*i.e.,* producing DX–DOASes which currently meet or exceed the proposed ISMRE2 and ISCOP2 minimum efficiency levels) and what portion of annual cash flow these DX–DOASes comprise. However, DOE did examine potential impacts on small manufacturers in its regulatory flexibility analysis, which is presented in section VII.B of this NOPR.

For individual consumers, DOE measures the economic impact by calculating the changes in LCC and PBP associated with new or amended standards. These measures are discussed further in the following section. For consumers in the aggregate, DOE would also calculate the national net present value of the consumer costs and benefits expected to result from particular standards, while taking into account the impacts of potential standards on identifiable subgroups of consumers that may be affected disproportionately by a standard.

DOE continues to seek information that may inform a market and technology assessment for the DX–DOAS industry, including data on ISMRE2 and ISCOP2 market efficiency distributions, and shipments.

DOE did not perform an LCC or an assessment of NPV for this rulemaking because there was not enough information available to develop the inputs required to measure the individual or aggregate consumer savings from higher standards. The LCC would require an engineering analysis, an energy use analysis, operating cost inputs, and a distribution of efficiencies that are available on the market. These inputs allow DOE to develop equipment prices, representative efficiency levels, annual operating costs, and a no-standards case distribution of equipment efficiencies to determine which consumers will be impacted by a higher standard. The NIA takes the weighted average national results from the LCC and combines them with shipments forecasts by equipment class and efficiency level in order to measure the national impact, in terms of consumer NPV and full-fuel-cycle energy savings. As stated previously, DOE was unable to develop cost-efficiency curves for DX–DOASes or to conduct an energy use analysis with enough degree of certainty that would allow it to propose a standard level more stringent than ASHRAE Standard 90.1 (*see* section III.D.2 of this document). Without these inputs, DOE is unable to produce the LCC and NIA for this NOPR.

b. Savings in Operating Costs Compared to Increase in Price (LCC and PBP)

EPCA requires DOE to consider the savings in operating costs throughout the estimated average life of the covered 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.

In the September 2019 NODA/RFI DOE developed an efficiency distribution that assumed that one-third of the products were at each of the three efficiency levels. 84 FR 48006, 48030. DOE requested comment on this approach and input on how to determine the no-standards case efficiency distribution given the lack of publicly available data on equipment efficiency. DOE also sought historical shipment weighted efficiency data by equipment class.

In response, AHRI and Trane both generally supported the approach DOE took which assumed that one-third of the units were at each of the proposed efficiency levels. (AHRI, No. 7, p. 11; Trane, No. 5, p. 3). AHRI and Trane both commented that they do not collect shipments data by efficiency level. (AHRI, No. 7, p. 11; Trane, No. 5, p. 3)

DOE also lacked data on the equipment lifetime for DX–DOASes in the September 2019 NODA/RFI. However, DOE had developed lifetimes for other commercial package air conditioning equipment in previous rulemakings,[19] therefore the DX–DOAS lifetime was set to be the same as that of a 15-ton commercial package air conditioner. 84 FR 48006, 48031. DOE also requested comment on DX–DOAS lifetimes.

In response, AHRI, the CA IOUs, and Trane all agreed with the approach that a DX–DOAS lifetime would be similar to that of a 15-ton commercial package air conditioner. (AHRI, No. 7, p. 11,

90.1 ''every 6 years'' to determine whether the applicable energy conservation standards need to be amended. (42 U.S.C. 6313(a)(6)(C)(i)) DOE must publish either a NOPR to propose amended standards or a notice of determination that existing standards do not need to be amended. (42 U.S.C. 6313(a)(6)(C)) In proposing new standards under the 6-year review, DOE must undertake 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))

[19] Direct Final Rule Life-Cycle-Cost Analysis Spreadsheet is available at: *www.regulations.gov/document?D=EERE-2013-BT-STD-0007-0106.* (Last accessed on August 9, 2021)

Trane, No. 5, p. 3, CA IOUs, No. 6, p. 7)

A preliminary energy use analysis was presented in the September 2019 NODA/RFI, and DOE requested feedback on its calculation approach as well as data from field studies and laboratory testing to further inform the estimation of real-world energy usage from performance ratings. 84 FR 48006, 48026–48027.

7AC commented that the actual energy consumption in buildings can be significantly higher than the tested ISMRE suggests, primarily at lower loads where the regular on/off cycling reduces actual energy load. (7AC, No. 4, p. 1) DOE understands that 7AC is referring to cycling start-up losses which occur when staged compressor systems turn on and off to meet a reduced cooling (or heating) demand. The impact of cycling losses is now captured in AHRI 920–2020, which DOE has proposed to incorporate into a new DOE test procedure for DX–DOASes. Specifically, the updated test procedure includes provisions for weighted averaging when the target conditions can be bracketed by two stages, as well as cyclic degradation calculations and a supplementary cooling penalty when the lowest stage provides excess conditioning capacity (which is when cycling losses would occur). 86 FR 36018, 36032–36033.

7AC also agreed that field data should be sought to complement the lab data and correlate ISMRE in the lab with performance in the field. (7AC, No. 4, p. 1) Additionally, 7AC indicated that LDHX-based units are being installed with remote monitoring equipment that will enable the measurement of total cooling and total power use, the cost of which has come down dramatically and that DOE should seek similar arrangements with other equipment providers. (*Id.*) 7AC did not provide data correlating tested performance ratings to performance in field-installed conditions. AHRI stated that it was unable to provide data in response to DOE's request. (AHRI, No. 7, p. 10) AHRI suggested that DOE consider addendum ''bi'' of ASHRAE Standard 90.1–2013, which limits heating supply air to a maximum of 60 °F when the majority of a building is expected to require cooling, in any energy use estimates. (AHRI, No. 7, p. 11)

The elimination of the supplemental heat penalty in the ISMRE2 metric (*see* section IV.B.1 of this document) makes it so that DX–DOASes are no longer required to deliver supply air of at least 70 °F in the test procedure. In the July 2021 Test Procedure NOPR, DOE discussed that DX–DOASes typically cool air to, at most, a few degrees above the 55 °F dew point temperature that is specified in AHRI 920. 86 FR 36018, 36031. Therefore, DOE expects that the establishment of ISMRE2 as a regulated metric for DX–DOASes would not preclude manufacturers from producing DX–DOASes which are compliant with the aforementioned provision in ASHRAE Standard 90.1–2013.

The energy use analysis presented in the September 2019 NODA/RFI relied on the energy use for ventilation and space cooling from the 2012 Commercial Building Energy Consumption Survey [20] (CBECS 2012) to develop the ASHRAE level unit energy consumption (UEC) estimates. The UECs for higher ELs were scaled based on the ISMRE levels presented in the September 2019 NODA/RFI. 84 FR 48006, 48026–48027. With an integrated metric, the power consumption at part loads is critical to understanding the energy consumption at various efficiency levels; however, no part-load data was available to DOE at the time of publication in September 2019. DOE included 30 percent of the space cooling energy use from CBECS 2012 along with the ventilation energy use to derive the UEC. 84 FR 48006, 48027.

Trane agreed with associating building ventilation cooling with the DX–DOAS unit but disagreed with adding 30 percent of the building annual cooling load to this value because it may overstate the typical cooling duty cycle. (Trane, No. 5, p. 3) Trane stated that many DX–DOAS systems are designed to provide no cooling for the building and requested that published case studies be cited to determine the estimated cooling load percentage handled by the DX–DOAS. (*Id.*)

DOE would consider such data in its energy use analysis should it become available. However, DOE is not presenting an energy use analysis in this NOPR due to insufficient market data, performance data, and field use data. In response to Trane, while DX–DOASes may not be designed to provide space cooling, there is no variable in CBECS 2012 for dehumidification. DX–DOASes provide dehumidification by cooling the ventilation air, therefore DOE included 30 percent of the space cooling energy use from CBECS 2012 along with the ventilation energy use to derive the UEC.

DOE requested field data or performance data of DX–DOASes in the September 2019 NODA/RFI and received no data. In order to develop UECs that are representative of DX–DOAS installations across the U.S., DOE would require data on the equipment performance at different load conditions. This data could consist of manufacturer performance data or field data for equipment rated using ISMRE2 and ISCOP2, if applicable. As DX–DOASes would be newly regulated equipment and ISMRE2 and ISCOP2 are new metrics even within the DX–DOAS market, there is no energy consumption data available. In addition, DOE was unable to develop appropriate efficiency levels to analyze (*see* section III.D.2.c of this document). Given the lack of available data regarding the performance of DX–DOASes, DOE is unable to estimate the UECs.

DOE did not perform an LCC and PBP analysis for this NOPR. As discussed in the preceding paragraphs there is not enough information available to develop the inputs to the LCC and PBP models.

c. 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))

In the September 2019 NODA/RFI, DOE presented its initial national energy savings methodology and estimates for air-cooled DX–DOASes with and without VERS. 84 FR 48006, 48030–48033. The NES requires inputs from the energy use analysis. As stated in section III.D.2.d, DOE was unable to conduct an energy use analysis. Therefore, DOE has not conducted or updated an NES analysis for this NOPR.

d. 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 has tentatively determined that the standards proposed in this document would not reduce the utility or performance of the equipment under consideration in this rulemaking because DOE is proposing to adopt standards of equivalent stringency to those already found in ASHRAE Standard 90.1.

[20] *See www.eia.gov/consumption/commercial/data/2012/index.php?view=microdata* (Last accessed on August 9, 2021).

e. Impact of Any Lessening of Competition

EPCA directs DOE to consider the impact of any lessening of competition, as determined in writing by the Attorney General, that is likely to result from a proposed standard. (42 U.S.C. 6313(a)(6)(B)(ii)(V)) DOE invites comment from the public regarding the competitive impacts that are likely to result from this proposed rule.

f. Need for National Energy Conservation

DOE also considers the need for national energy and water 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 proposed 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 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 proposed 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.

The utility impact analysis, emissions analysis, and emissions monetization all rely on the national energy savings estimates from the NIA. As discussed previously, DOE did not conduct an NIA and as a result could not conduct these downstream analyses.

g. 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.''

IV. Crosswalk Analysis

A. Overview

As discussed in section III.D of this NOPR, DOE is proposing to adopt ISMRE2 and ISCOP2 minimum efficiency levels of equivalent stringency to the ISMRE and ISCOP minimum efficiency levels currently published in ASHRAE Standard 90.1. The determination of these equivalent ISMRE2 and ISCOP2 efficiency levels is referred to as a ''crosswalk analysis.''

AHRI commented that the current ASHRAE Standard 90.1 levels reflect the current DX–DOAS market, however, that use of ANSI/AHRI 920–2015 is not ideal and this test procedure was undergoing revisions at the time. AHRI stated that harmonizing the Federal energy conservation standards with ASHRAE Standard 90.1 energy efficiency levels would help reduce compliance and test burdens on manufacturers; however, the metrics would change with the revision to AHRI 920. AHRI commented that the changes may seem drastic between the first and second edition of a standard, but they were agreed to by relevant stakeholders. (AHRI, No. 7, pp. 7–9) Trane commented that the conditions and rating calculations were changed in the update to AHRI 920 so that independent test labs could easily generate reliable results for these products, and Trane prefers that AHRI 920–2020 be the basis for any new standard levels adopted by DOE for DX–DOASes. (Trane, No. 5 at p. 3)

As discussed in section II.B of this NOPR, in the July 2021 Test Procedure NOPR, DOE proposed a new Federal test procedure for DX–DOASes that would incorporate AHRI 920–2020, which is the most recent version of the test procedure (AHRI 920) recognized by ASHRAE Standard 90.1 for DX–DOASes. 86 FR 36018, 36022. The proposed test procedure incorporates AHRI 920–2020 in its entirety, with certain minor clarifications DOE has preliminarily determined would be consistent with the industry test procedure. 86 FR 36018, 36047. The updates to AHRI 920 include certain revised test conditions and weighting factors for ISMRE and ISCOP, which were redesignated as ISMRE2 and ISCOP2, respectively. These revisions result in the ISMRE2 and ISCOP2 metrics that more accurately reflect the actual energy use for DX–DOASes, improve the repeatability and reproducibility of the test methods, and also reduce testing burden compared to ISMRE and ISCOP.

The minimum energy efficiency levels specified for DX–DOASes in ASHRAE Standard 90.1–2019 are not based on equipment efficiency as measured pursuant to AHRI 920–2020 (*i.e.,* ISMRE2 and ISCOP2). As a result, should DOE adopt the test procedure as proposed in the July 2021 TP NOPR, the efficiency measurements from the version of the industry test procedure recognized in ASHRAE Standard 90.1–2019 for DX–DOASes (*i.e.,* ISMRE and ISCOP), would not be comparable to efficiency measurements under the DOE test procedure. DOE would generally be required to adopt the ISMRE and ISCOP levels in ASHRAE Standard 90.1–2019 as the basis for energy conservation standards; however, in the case of an amended test procedure that would alter the measured energy efficiency or measured energy use of a covered ASHRAE equipment, EPCA prescribes requirements to amend the applicable energy conservation standard so that products or equipment that complied under the prior test procedure remain compliant under the amended test procedure. (*See generally* 42 U.S.C. 6293(e); 42 U.S.C. 6314(a)(4)(C)) While these provisions are not explicitly applicable to DX–DOASes in the present case because DOE currently has no test procedure or energy conservation standards for this equipment, DOE considers them as generally instructive for conducting the crosswalk analysis.

EPCA provides that in the case of any amended test procedure, DOE must determine, in the rulemaking carried out with respect to prescribing such procedure, to what extent, if any, the proposed test procedure would alter the measured energy efficiency, measured energy use, or measured water use of the subject ASHRAE equipment as determined under the existing test procedure. (*See* 42 U.S.C 6293(e); 42 U.S.C. 6314(a)(4)(C)) If the Secretary determines that the amended test procedure will alter the measured efficiency or measured use, the Secretary shall amend the applicable energy conservation standard during the rulemaking carried out with respect to such test procedure. In such case, under the process prescribed in EPCA DOE is directed to measure, pursuant to the amended test procedure, the energy efficiency or energy use of a representative sample of covered products that minimally comply with the existing standard. (*See* 42 U.S.C. 6293(e)(2); 42 U.S.C. 6314(a)(4)(C)) The average of such energy efficiency or energy use determined under the amended test procedure constitutes the amended energy conservation standard for the applicable covered products. (*Id.*)

As stated, EPCA requires DOE to adopt uniform national standards for DX–DOASes at the minimum level specified in the amended ASHRAE Standard 90.1, unless the Secretary determines, by rule published in the **Federal Register**, and supported by clear and convincing evidence, that adoption of a uniform national standard more stringent than the amended

ASHRAE Standard 90.1 would result in significant additional conservation of energy and is technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)) DOE has preliminarily determined that, in the present case given the limited data available, conducting a crosswalk analysis generally consistent with the process prescribed in 42 U.S.C. 6293(e)(2) would result in efficiency levels that are of the same stringency as those in ASHRAE Standard 90.1–2019.

A crosswalk analysis requires data on the performance of a representative sample of DX–DOASes under both test procedures. In response to the September 2019 NODA/RFI, 7AC offered to provide DOE with a full performance map of a 10-ton LDHX DX–DOAS. (7AC, No. 4, p. 1) However, as noted in section III.D.1.a of this NOPR, DOE understands LDHX technology to be a proprietary technology and thus could not consider it as representative for the crosswalk analysis. Trane suggested that it could provide information as confidential business information. (Trane, No. 5, p. 3) AHRI committed to working with DOE to develop an acceptable crosswalk based on calculations and test data, if available. (AHRI, No. 7, p. 9) DOE did not receive any submissions from stakeholders containing data that would help DOE conduct the crosswalk analysis. DOE determined the ISMRE-to-ISMRE2 crosswalk based on testing conducted by DOE and Pacific Gas and Electric. DOE determined the ISCOP-to-ISCOP2 crosswalk based on a technical analysis of heat pump performance. The methodology and results of the crosswalk analysis are presented in detail in the Crosswalk Analysis Support Document (CASD) [21] and are summarized in the following sections of this document.

B. ISMRE-to-ISMRE2 Crosswalk

1. Dehumidification Efficiency Test Procedure Changes

In the September 2019 NODA/RFI, DOE requested comment and data on developing a potential crosswalk from the efficiency levels in ASHRAE 90.1–2016 based on ANSI/AHRI 920–2015 to efficiency levels based on the revisions to AHRI 920 (*i.e.,* AHRI 920–2020). 84 FR 48006, 48022. While DOE is proposing to adopt the test procedure in AHRI 920–2020 with minor revisions, these revisions are not expected to have an impact on DX–DOAS ratings. 86 FR 36018, 36046. As such, the minor revisions to the procedure in AHRI 920–2020 proposed by DOE would not impact the crosswalk or the following discussion.

DOE received comments from two stakeholders regarding the test procedure updates in AHRI 920–2020 which affect the dehumidification efficiency rating. (AHRI, No. 7, pp. 8–9; CA IOUs, No. 6, pp. 6–7) The comments from stakeholders regarding the potential impacts of the update from ANSI/AHRI 920–2015 to AHRI 920–2020 on the ISMRE-to-ISMRE2 crosswalk are presented in Table IV.1. Although the comments do not provide quantitative indication of the expected change in the measurement, they suggest the direction and general magnitude of the change in the ISMRE-to-ISMRE2 crosswalk.

TABLE IV.1—TEST PROCEDURE UPDATES IMPACTING ISMRE-TO-ISMRE2 CROSSWALK

ANSI/AHRI 920–2015	AHRI 920–2020	Expected impact on dehumidification efficiency rating
Specifies inlet (outdoor ventilation air and return air) dry bulb and wet bulb conditions for four Standard Rating Conditions (SRCs) A, B, C, and D.	Revises inlet conditions at SRCs C & D[a]	Decrease in MRE at SRC D for units with VERS due to less favorable conditions.[a]
Specifies minimum required external static pressures (ESPs) for supply air streams as a function of supply airflow rate.	Increases minimum required ESPs for supply air streams;[a] establishes minimum required ESPs for return air streams (for units with VERS)[a b].	Decrease in ISMRE2 due to increased fan power at higher static pressures.[b]
Specifies weighting coefficients to calculate ISMRE from the moisture removal efficiencies (MREs) at the four SRCs.	Revises weighting coefficients;[a b] re-labels efficiency metric as ISMRE2[a b].	Increase in ISMRE2 due to greater weight on SRCs A and B.[b]
Does not include instructions for achieving the target supply air conditions for units with staged capacity control.	Provides an interpolation method and a degradation coefficient calculation to determine efficiency for units with staged capacity control[a].	Decrease in ISMRE2 for units with staged capacity because excess dehumidification is not credited.[a]
Penalizes delivery of supply air below 70 °F (the ''supplementary heat penalty'').	Eliminates the supplementary heat penalty for ISMRE2[a b].	Increase in ISMRE2 due to removal of penalty;[b] increase in ISMRE2 due to decrease in discharge head pressure (higher head pressures are required to increase reheat capacity, but also increase compressor power draw).[b]
Does not require a consistent supply air dew point temperature across all SRCs.	Requires that SRCs B–D target the supply air dew point temperature achieved at SRC A within a 0.3 °F condition tolerance[a].	Decrease in ISMRE2 for units with staged capacity because excess dehumidification is not credited.[a]
Does not specify how to calculate MRE for units with VERS.	Includes instructions for calculating the total moisture removal capacity for units with VERS;[a] provides specific equations to apply the interpolation method and degradation coefficient method to units with VERS[a].	Decrease in ISMRE2 for units with staged capacity because excess dehumidification is not credited.[a]

[a] (AHRI, No. 7, pp. 8–9).
[b] (CA IOUs, No. 6, pp. 6–7).

[21] The CASD is available at *www.regulations.gov/docket/EERE-2017-BT-STD-0017.*

Comments from AHRI and the CA IOUs indicated that the various test procedure updates may generally lend to decreases in the dehumidification efficiency rating. (AHRI, No. 7, pp. 8–9; CA IOUs, No. 6, pp. 6–7)

2. Technical Analysis

DOE conducted investigative testing on four DX–DOASes and collaborated with Pacific Gas and Electric on testing of a fifth DX–DOAS to measure the average impact of the test procedure updates on the dehumidification efficiency metric.[22] A crosswalk consistent with the process prescribed at 42 U.S.C. 6293(e) would typically involve testing minimally compliant units, or in this case, testing units that had efficiencies at the minimum level specified in ASHRAE Standard 90.1–2019. As noted previously, ISMRE ratings for DX–DOASes are generally not available to determine which models may perform at the minimum ISMRE levels in ASHRAE Standard 90.1–2019. In its testing DOE determined that these DX–DOAS units had efficiencies above the ISMRE minima specified in ASHRAE Standard 90.1–2019. In order to account for this, DOE assessed the ISMRE-to-ISMRE2 crosswalk on the basis of an overall percent-change in the dehumidification efficiency metric, which can then be used to estimate the net impact of the updates to AHRI 920. The test results are summarized in Table IV.2.

TABLE IV.2—INVESTIGATIVE TESTING RESULTS

Sample No.	Equipment class	MRC at SRC A	ASHRAE Standard 90.1 minimum ISMRE	Tested ISMRE	Tested ISMRE2	Percent change
1	AC w/o VERS	111 lb/h	4.0	5.1	5.7	+12%
2	AC w/o VERS	94 lb/h	4.0	7.6	6.4	−16%
3	AC w/o VERS	72 lb/h	4.0	4.6	5.2	+14%
4	AC w/ VERS	256 lb/h	5.2	6.9	6.0	−13%
5	WSHP w/ VERS	136 lb/h	4.8	8.6	6.8	−21%
Average						−5%

On average, the updates to AHRI 920 have a net impact of reducing the dehumidification efficiency ratings of DX–DOASes by five percent. These results are consistent with the comments provided by stakeholders indicating a general decrease in ratings. The tested units ranged from a reduction of 21% to an increase of 14%. The units which were negatively impacted by the test procedure changes were those which had the highest ISMRE ratings compared to the ASHRAE Standard 90.1–2019 minima (samples no. 2, 4, and 5). The units which had ISMRE ratings closer to the ASHRAE Standard 90.1–2019 minima (samples no. 1 and 3), by contrast, increased in rating; therefore, DOE tentatively does not expect DX–DOASes which are only minimally compliant with the ASHRAE Standard 90.1–2019 ISMRE levels to reduce in rating by more than five percent based on the limited test data available indicating that an increase in rating is possible for these designs. DOE would consider additional crosswalk data from DX–DOAS models which are minimally compliant with the ASHRAE Standard 90.1–2019 ISMRE levels should such data become publicly available.

Based on the available data, DOE is proposing ISMRE2 standards that are five percent lower than the ASHRAE Standard 90.1–2019 ISMRE levels. DOE's methodology is described in further detail in sections 2.2–2.3 of the CASD, and the resulting ISMRE2 levels are proposed in Table IV.4 of this NOPR.

C. ISCOP-to-ISCOP2 Crosswalk

1. Heating Efficiency Test Procedure Changes

DOE received comments from AHRI regarding the test procedure updates in AHRI 920–2020 which affect the heating efficiency rating. (AHRI, No. 7, pp. 8–9) These comments are presented in Table IV.3. DOE did not receive comments indicating the actual impacts of each test procedure update on the heating efficiency metric.

TABLE IV.3—TEST PROCEDURE UPDATES IMPACTING ISCOP-TO-ISCOP2 CROSSWALK

ANSI/AHRI 920–2015	AHRI 920–2020 & July 2021 test procedure NOPR
Specifies inlet (outdoor ventilation air and return air) dry bulb and wet bulb conditions for two SRCs E and F.	Revises inlet conditions at SRCs E & F.
Specifies minimum required external static pressures (ESPs) for supply air streams as a function of supply airflow rate.	Increases minimum required ESPs for supply air streams;[a] establishes minimum required ESPs for return air streams (for units with VERS).[a]
Specifies weighting coefficients to calculate ISCOP from the coefficients of performance (COPs) at the two SRCs.	Revises weighting coefficients;[a] re-labels efficiency metric as ISMRE2.[a]
Implies testing at both SRCs in order to calculate an ISCOP rating	Makes SRC F optional to test (with the resulting COP_F = 1.0) in order to calculate an ISCOP2 rating.
Instructs that the target supply air dry bulb temperature must be as close to 75 °F as possible. Credits delivery of supply air above 75 °F in determination of total heating capacity.	Provides an interpolation method to determine efficiency for units with staged capacity control; specifies that the supply air temperature for the determination of total heating capacity must be 70–75 °F.[a]

[22] Data from Sample No. 3 was collected as part of a collaboration between Pacific Gas & Electric and DOE. Sample point no. 3 is the result of testing one DX–DOAS with multiple control configurations, as discussed in section 2.2 of the CASD. These configurations investigated a range of staging, reheat, and airflow control options available to manufacturers for testing DX–DOASes within the allowances of ANSI/AHRI 920–2015 and AHRI 920–2020. The data shown in Table IV.4 for Sample point no. 3 are the average results of the control configurations tested. Data for each individual configuration is provided in the CASD.

TABLE IV.3—TEST PROCEDURE UPDATES IMPACTING ISCOP-TO-ISCOP2 CROSSWALK—Continued

ANSI/AHRI 920–2015	AHRI 920–2020 & July 2021 test procedure NOPR
Specifies multiple inlet water conditions for water-source heat pump DX–DOASes at each SRC.	Revises inlet water conditions; assigns 'water-source heat pump' as the inlet condition for ISCOP2 ratings.

[a] (AHRI, No. 7, pp. 8–9).

DOE considered the updates in AHRI 920–2020 in its calculated performance of heat pump DX–DOASes. One notable factor affecting the ratings of heat pump DX–DOASes is that ANSI/AHRI 920–2015 did not specify a target supply air dry bulb temperature range for determining ratings, whereas AHRI 920–2020 specifies that ratings must be based on temperatures between 70 °F and 75 °F. As a result, heating in excess of 75 °F was credited in ANSI/AHRI 920–2015 but is no longer considered in AHRI 920–2020 (the supplementary heat penalty for delivery of supply air below 70 °F is maintained in both test procedures). The impact of this would be a decrease in rating for units that have coarse staging of compressor capacity, which may result in overshooting the 75 °F limit due to the inability to unload capacity.

2. Technical Analysis

DOE did not receive data from commenters regarding ISCOP or ISCOP2 performance ratings. DOE is aware of only one manufacturer publishing ISCOP ratings and one other manufacturer publishing ISCOP2 ratings. Due to insufficient market data for the ISCOP-to-ISCOP2 crosswalk, DOE evaluated the performance of representative heat pump DX–DOAS designs under both test procedures using engineering-based analysis to determine the crosswalk.

DOE calculated results for a two-stage heat pump system delivering approximately 15 tons of capacity based on a design description consistent with AHRI comments (*see* section III.D.3.c of this NOPR) and based on the calculated results identified that that the test procedure updates affect each heat pump equipment class in different ways. DOE also calculated results for smaller 3–4 ton heat pump systems with only one compressor stage. The assumptions and inputs of this calculation are provided in detail in section 3.3 of the CASD. DOE assumed that air-source heat pumps without VERS would deactivate heat pump operation at SRC F and assume a default COP_F of 1.0 for both ISCOP and ISCOP2; air-source heat pumps with VERS would also deactivate heat pump operation at SRC F but would be capable of running the VERS to provide some sensible heating capacity for both ISCOP and ISCOP2. The outputs are provided in sections 3.4 and 3.5 of the CASD. In general, DOE observed that air-source heat pump DX–DOASes without VERS may reduce in rating because AHRI 920–2020 does not credit excess heating above 75 °F. Air-source heat pump DX–DOASes with VERS may use VERS-only operation as the lowest-capacity stage to interpolate to a supply air temperature between 70 °F and 75 °F, thus avoiding being penalized for excess heating. As a result, air-source heat pump DX–DOASes may slightly increase in rating. DOE observed (in testing of a water-source heat pump DX–DOAS, as well as in its calculations) that water-source heat pump DX–DOASes generally perform better at SRC F than at SRC E (under both test procedures), but the reduction in the averaging weight for SRC F for ISCOP2 would cause the ISCOP2 value to decrease for water-source heat pump DX–DOASes as compared to ISCOP. Like the air-source heat pump DX–DOASes, DOE found that water-source heat pump DX–DOASes without VERS might be more sensitive to the target supply air temperature requirements than water-source heat pump DX–DOASes with VERS. DOE applied the average change in rating to the ASHRAE Standard 90.1 ISCOP levels, and the resulting ISCOP2 levels are provided in Table IV.4.

D. Crosswalked Standard Levels

DOE crosswalked the ASHRAE Standard 90.1–2019 minimum ISMRE and ISCOP efficiency levels for DX–DOASes to determine standards of an equivalent stringency in terms of the updated metrics ISMRE2 and ISCOP2. The results of this analysis are shown in Table IV.4.

TABLE IV.4—CROSSWALKED EFFICIENCY LEVELS FOR DX–DOASES

Subcategory	ASHRAE Standard 90.1–2019 level using ANSI/AHRI 920–2015	Equivalent stringency level using proposed DOE TP
(AC)—Air-cooled without ventilation energy recovery systems.	ISMRE = 4.0	ISMRE2 = 3.8.
(AC w/VERS)—Air-cooled with ventilation energy recovery systems.	ISMRE = 5.2	ISMRE2 = 5.0.
(ASHP)—Air-source heat pumps without ventilation energy recovery systems.	ISMRE = 4.0, ISCOP = 2.7	ISMRE2 = 3.8, ISCOP2 = 2.05.
(ASHP w/VERS)—Air-source heat pumps with ventilation energy recovery systems.	ISMRE = 5.2, ISCOP = 3.3	ISMRE2 = 5.0, ISCOP2 = 3.20.
(WC)—Water-cooled without ventilation energy recovery systems.	ISMRE = 4.9	ISMRE2 = 4.7.
(WC w/VERS)—Water-cooled with ventilation energy recovery systems.	ISMRE = 5.3	ISMRE2 = 5.1.
(WSHP)—Water-source heat pumps without ventilation energy recovery systems.	ISMRE = 4.0, ISCOP = 3.5	ISMRE2 = 3.8, ISCOP2 = 2.13.
(WSHP w/VERS)—Water-source heat pumps with ventilation energy recovery systems.	ISMRE = 4.8, ISCOP = 4.8	ISMRE2 = 4.6, ISCOP2 = 4.04.

Issue-3: DOE requests comment on the proposed minimum ISMRE2 and ISCOP2 standards for DX–DOASes, as well as comment on any aspect of its crosswalk analysis, which is detailed in the CASD. DOE continues to seek information which compares ISMRE and ISCOP ratings to ISMRE2 and ISCOP2 ratings for the DX–DOASes that are representative of the market baseline efficiency level.

V. Conclusions

A. Proposed Energy Conservation Standards

EPCA requires DOE to establish an amended uniform national standard for small, large, and very large commercial package air conditioning and heating equipment, which includes DX–DOASes, at the minimum level specified in the amended ASHRAE Standard 90.1 unless DOE determines, by rule published in the **Federal Register**, and supported by clear and convincing evidence, that adoption of a uniform national standard more stringent than the amended ASHRAE Standard 90.1 would result in significant additional conservation of energy and is technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)(I)–(II)). DOE is proposing to adopt energy conservation standards for DX–DOASes that are of equivalent stringency as the minimum levels specified in ASHRAE Standard 90.1–2019. As discussed in the following section, DOE has tentatively determined it lacks clear and convincing evidence that adoption of more stringent standards would result in additional conservation of energy and would be technologically feasible and economically justified.

DOE is proposing standards using the ISMRE2 and ISCOP2 metrics, which are the metrics used in the most recent version of the industry test procedure for DX–DOAS recognized by ASHRAE Standard 90.1–2019 (*i.e.,* AHRI 920–2020) Based on the crosswalk analysis presented, DOE preliminarily determines that the proposed energy conservation standards in terms of ISMRE2 and ISCOP2 are of equivalent stringency to the standards for DX–DOAS in ASHRAE Standard 90.1–2019, which rely on the ISMRE and ISCOP metrics.

The proposed standards for DX are shown in Table V.1 of this NOPR. The proposed standards, if adopted would apply to all DX–DOASes with an MRC of less than 324 lbs moisture/hr manufactured in, or imported into, the United States starting on the compliance date discussed in section VI.C of this document.

TABLE V.1—PROPOSED ENERGY CONSERVATION STANDARDS FOR DX–DOASES

Equipment type	Subcategory	Efficiency level
Dehumidifying direct-expansion dedicated outdoor air systems.	(AC)—Air-cooled without ventilation energy recovery systems.	ISMRE2 = 3.8.
	(AC w/VERS)—Air-cooled with ventilation energy recovery systems.	ISMRE2 = 5.0.
	(ASHP)—Air-source heat pumps without ventilation energy recovery systems.	ISMRE2 = 3.8, ISCOP2 = 2.05.
	(ASHP w/VERS)—Air-source heat pumps with ventilation energy recovery systems.	ISMRE2 = 5.0, ISCOP2 = 3.20.
	(WC)—Water-cooled without ventilation energy recovery systems.	ISMRE2 = 4.7.
	(WC w/VERS)—Water-cooled with ventilation energy recovery systems.	ISMRE2 = 5.1.
	(WSHP)—Water-source heat pumps without ventilation energy recovery systems.	ISMRE2 = 3.8, ISCOP2 = 2.13.
	(WSHP w/VERS)—Water-source heat pumps with ventilation energy recovery systems.	ISMRE2 = 4.6, ISCOP2 = 4.04.

B. Consideration of More Stringent Efficiency Levels

As stated, EPCA requires DOE to establish an amended uniform national standard for equipment classes at the minimum level specified in the amended ASHRAE Standard 90.1 unless DOE determines, by rule published in the **Federal Register**, and supported by clear and convincing evidence, that adoption of a uniform national standard more stringent than the amended ASHRAE Standard 90.1 would result in significant additional conservation of energy and is technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)(I)–(II)). As noted above, clear and convincing evidence would exist only where the specific facts and data made available to DOE regarding a particular ASHRAE amendment demonstrate that there is no substantial doubt that a standard more stringent than that contained in the ASHRAE Standard 90.1 amendment is permitted because it would result in a significant additional amount of energy savings, is technologically feasible and economically justified. Process Rule section 9(b).

As discussed, DOE has not established standards or test procedures for DX–DOASes, and ASHRAE did not specify standards for such equipment until 2016. The market for DX–DOASes is still developing. Efficiency in terms of ISMRE and ISCOP is generally not provided by manufacturers and only a limited number of units are rated in terms of ISMRE2. DOE is not aware of any market or performance database for DX–DOASes. DOE has requested data that is representative of the market, but to date has not received any such data.

As discussed in the sections, III.D.1.a., III.D.1.b., III.D.3.a., and III.D.3.b of this NOPR, due to the lack of available market and performance data, DOE is unable to conduct the analysis necessary to evaluate the potential energy savings or evaluate whether more stringent standards would be technologically feasible or economically justifiable, with sufficient certainty. An estimation of energy savings potentials of more stringent energy efficiency levels would require developing efficiency data for the entire DX–DOASes market, which would be a much broader analysis than that conducted for the crosswalk. The crosswalk analysis presented in this NOPR requires only that DOE translate the efficiency levels between the metrics at the baseline levels, and not that DOE translate all efficiency levels currently represented in the market. As noted, there is a lack of market data regarding the performance of DX–DOASes. As

such, DOE has preliminarily determined that it lacks clear and convincing evidence that more stringent standards would result in significant additional conservation of energy and would be technologically feasible and economically justified.

VI. Representations, Certification and Compliance Requirements

A. Representations

The July 2021 Test Procedure NOPR proposed several provisions for the determination of represented values for DX–DOASes, including a definition for a basic model of DX–DOAS, sampling plan requirements, considerations for equipment compatible with multiple refrigerants, alternative energy determination methods (AEDMs), and rounding requirements. 86 FR 36018, 36043–36045.

DOE proposed that a basic model for a DX–DOAS means all units manufactured by one manufacturer within a single equipment class; with the same or comparably performing compressor(s), heat exchangers, ventilation energy recovery system(s) (if present), and air moving system(s), and with a common ''nominal'' moisture removal capacity. 86 FR 36018, 36044. This proposed definition of a basic model of a DX–DOAS would be included in the regulatory text in 10 CFR 431.92. *Id.*

Because DX–DOASes and Unitary DOASes are types of commercial package air-conditioning and heating equipment, DOE proposed to apply the existing sampling plan requirements for commercial package air-conditioning and heating equipment under 10 CFR 429.43, *Commercial heating, ventilating, air conditioning (HVAC) equipment,* to DX–DOASes. 86 FR 36018, 36044.

As discussed in the July 2021 Test Procedure NOPR, DOE recognizes that some commercial package air-conditioning and heating equipment may be sold with more than one refrigerant option (*e.g.,* R–410A or R–407C). 86 FR 36018, 36044. Typically, manufacturers specify a single refrigerant in their literature for each unique model, but in its review, DOE has identified at least one manufacturer that provides two refrigerant options under the same model number. The refrigerant chosen by the customer in the field installation may impact the energy efficiency of a unit. For this reason, DOE proposed representation requirements specific for models approved for use with multiple refrigerants. *Id.*

Use of a refrigerant that requires different hardware (such as R–407C as compared to R–410A) would represent a different basic model, and according to the current CFR, separate representations of energy efficiency are required for each basic model. 86 FR 36018, 36044. However, some refrigerants (such as R–422D and R–427A) would not require different hardware, and a manufacturer may consider them to be the same basic model, which is not currently addressed. DOE proposed to add a new paragraph at 10 CFR 429.43(a)(3) specifying that a manufacturer must determine the represented values for that basic model based on the refrigerant(s)—among all refrigerants listed on the unit's nameplate—that result in the lowest ISMRE2 and ISCOP2 efficiencies, respectively. *Id.* These represented values would apply to the basic model for all refrigerants specified by the manufacturer as appropriate for use, regardless of which one may actually be used in the field, where only one set of values is reported. *Id.*

DOE proposed to allow manufacturers to use AEDMs for determining ISMRE2 and ISCOP2 ratings consistent with the existing provisions for commercial package air conditioning and heating equipment. 86 FR 36018, 36044. DOE also proposed to create four validation classes of DX–DOASes within the *Validation classes* table at 10 CFR 429.70(c)(2)(iv): Air-cooled/air-source and water-cooled/water-source, each with and without VERS. *Id.* This proposal requires testing of two basic models to validate the AEDMs for each validation class, with a tolerance of 10 percent when comparing test results with certified ISMRE2 and ISCOP2 ratings—identical to the requirements for other categories of commercial package air-conditioning and heating equipment. 86 FR 36018, 36045.

Finally, DOE proposed to adopt the performance metric rounding requirements found in Sections 6.1.2.1 through 6.1.2.8 of AHRI 920–2020 as part of the DOE test procedure, as enumerated in section 2.2.1(c)(iv) of the proposed appendix B. 86 FR 36018, 36045.

In this NOPR, DOE is proposing new provisions regarding DX–DOAS representations in addition to those proposed in the July 2021 Test Procedure NOPR. DOE is proposing to require that the represented value of MRC be either the mean of the MRCs measured for the units in the selected sample (*see* 10 CFR 429.43(a)(1)(ii)) rounded to the nearest lb/hr multiple according to Table 3 of AHRI 920–2020 or the MRC output simulated by an AEDM rounded to the nearest lb/hr multiple according to Table 3 of AHRI 920–2020. This provision seeks to ensure that the reported MRC is accurate to test or AEDM results and that the reported MRC is consistent with the requirements in AHRI 920–2020. The proposed definition for ''DX–DOAS'' includes a maximum MRC limitation of 324 lb/hr, hence DOE seeks to provide clear instructions for the determination of the MRC in representations.

Issue-4: DOE seeks feedback on the proposed representation requirement regarding MRC.

B. Certification and Enforcement Provisions

1. Scope

As discussed in section III.A of this NOPR, DOE is proposing a definition of DX–DOAS which specifies the capability to dehumidify outdoor air to a low dew point and a maximum MRC limit of 324 lbs moisture per hour (which is consistent with the 760,000 Btu per hour maximum capacity limit for other commercial package air-conditioning and heating equipment). Effective upon the compliance date for standards promulgated for DX–DOASes, manufacturers would be required to certify to DOE equipment meeting the DX–DOAS definition. However, as noted in section VI.B.3, DOE will address specific certification requirements for DX–DOASes in a different rulemaking prior to the compliance date for standards promulgated for DX–DOASes.

2. Equipment Selection and Sampling Plan

In the July 2021 Test Procedure NOPR, DOE stated by proposing to define (at 10 CFR 431.92) DX–DOAS as a subset of Unitary DOAS, and to define Unitary DOAS as a category of small, large, or very large commercial package air conditioning and heating equipment, the proposal would apply the same sampling requirements to DX–DOASes as applicable to other commercial package air conditioning and heating equipment under 10 CFR 429.43, *Commercial heating, ventilating, air conditioning (HVAC) equipment.* 86 FR 36018, 36044. DX–DOAS-specific requirements are discussed in section VI.A of this document.

In the July 2021 Test Procedure NOPR DOE discussed one comment received on the sampling plan requirements. Lennox had recommended that DOE harmonize the certification criteria for commercial HVAC equipment in 10 CFR 429.43 with those for central air conditioners, a consumer product, in 10 CFR 429.16.; Lennox stated that

commercial equipment currently has a more stringent confidence limit of 95 percent, but the commenter argued that current testing technology does not support this level of precision. 86 FR 36018, 36044. DOE noted that other manufacturers did not raise concerns regarding the confidence limit required for sampling more typical commercial package air conditioning and heat pump equipment, and Lennox had not provided data regarding variability of units in production and testing; therefore, absent more specific information or data regarding the stringency of the confidence level, DOE did not propose a change. *Id.*

As discussed in section VI.A of this NOPR, DOE is maintaining its previous proposals regarding equipment selection and sampling plan requirements.

3. Certification Requirements

Manufacturers, including importers, must use equipment-specific certification templates to certify compliance to DOE. There are currently no certification or reporting requirements for DX–DOASes. For covered equipment, the certification template reflects the general certification requirements specified at 10 CFR 429.12 as well as the equipment-specific requirements. Certification reports for commercial package air-conditioning and heating equipment must include supplemental test information. 10 CFR 429.43(b)(4). In particular, the equipment-specific, supplemental information must include any additional testing and testing set up instructions (*e.g.,* charging instructions) for the basic model; identification of all special features that were included in rating the basic model; and all other information (*e.g.,* operational codes or component settings) necessary to operate the basic model under the required conditions specified by the relevant test procedure. (10 CFR 429.43(b)(4)).

DOE is not proposing to establish certification requirements for DX–DOASes in this NOPR. Instead, DOE may consider proposals to establish certification requirements for DX–DOASes under a separate rulemaking regarding appliance and equipment certification. To help interested parties better appreciate the proposed requirements, a draft certification template will be included in the docket of the certification rulemaking.

4. Enforcement Provisions

Enforcement provisions for commercial package air-conditioners and heat pumps are set forth at 10 CFR 429.110(e)(2). The existing provisions specify reliance on an initial sample size of not more than four units. 10 CFR 429.110(e)(2). For an ''assessment test,'' DOE may obtain one or more units for testing at any time. *See* 10 CFR 429.104. For an ''enforcement test,'' DOE issues a test notice requiring the manufacturer to provide units for testing. 10 CFR 429.110(b). DOE uses the results of assessment testing as one tool when determining whether to pursue enforcement testing. *See* 10 CFR 429.106. DOE may pursue enforcement testing if it has reason to believe that a basic model is not in compliance with applicable standards (10 CFR 429.110(a))—a determination that is informed but not based solely on assessment test results. DOE has set forth different sampling plans for DOE enforcement testing of covered equipment and certain low-volume covered products. Appendix B to subpart C of part 429. These sampling plans utilize a test sample of no more than 4 units for low-volume, built-to-order basic models, which would include DX–DOASes. These sampling plans are set forth in appendix B to subpart C to part 429. DOE proposes that the enforcement provisions generally applicable to commercial package air-conditioning and heating equipment would be applicable to DX–DOASes.

In addition, when determining compliance of any DX–DOAS units tested for enforcement purposes, DOE proposes to adopt provisions at 10 CFR 429.134 that specify how DOE would determine the ISMRE2 and ISCOP2 for DX–DOASes with VERS. Specifically, if the unit is rated based on testing to either Option 1 or Option 2, manufacturers may choose to use VERS EATR ratings based on AHRI 1060–2018 (or AHRI 1060 performance rating software) or default EATR values to calculate MRC and/or total heating capacity to rate the DX–DOAS. For Option 2, manufacturers may use VERS effectiveness and EATR ratings based on AHRI 1060–2018 or default values to set the simulated test conditions for rating the DOAS.

If a manufacturer chooses to use default VERS performance values, DOE proposes that it could choose to use those values, or alternatively test the VERS according to AHRI 1060–2018 to obtain those values. If a manufacturer used AHRI 1060–2018 rated values,[23] DOE proposes that it may conduct enforcement testing to AHRI 1060–2018 (with a zero-degree purge angle). In this case, DOE would determine the ISMRE2 and/or ISCOP2 using the certified VERS performance values from AHRI 1060–2018 if all certified values of sensible effectiveness are found to be no greater than 105 percent of the mean of the measured values (for Option 2), all values of latent effectiveness are found to be no greater than 107 percent of the mean of the measured values (for Option 2), and EATR is found to be no more than one percentage point less than the mean of the measured values (for Options 1 and 2). Otherwise, DOE would use the mean of the measured values to determine ISMRE2 and/or ISCOP2.

DOE is proposing these tolerances on the certified values based on tolerances specified in AHRI 1060–2018. DOE believes these tolerances are also appropriate for DOE's enforcement testing program as they represent typical variability for this equipment.

In addition, DOE proposes that if a manufacturer is relying on AHRI-certified product performance calculation software for VERS as part of its representation of DX–DOAS efficiency, a manufacturer would be required to retain all data underlying those AHRI-certified results as part of its underlying test data for DOE certification testing as specified in 10 CFR 429.71(a)–(c).

Issue–5: DOE requests comment on its proposed DX–DOAS-specific enforcement provisions, and in particular, the appropriateness of the proposed tolerances on certified values.

C. Compliance Dates

When establishing energy conservation standards at the same level as in ASHRAE Standard 90.1, EPCA requires DOE to establish such standards no later than 18 months following the ASHRAE Standard 90.1 update. (42 U.S.C. 6313(a)(6)(A)(ii)(I)) If DOE prescribes energy conservation standards at the efficiency levels contained in an amended ASHRAE Standard 90.1, EPCA states that compliance with any such standards shall be required on or after a date which is two or three years (depending on equipment size) after the compliance date of the applicable minimum energy efficiency requirement in the amended ASHRAE standard. (42 U.S.C. 6313(a)(6)(D)) With respect to small commercial package air conditioning and heating equipment, the initial compliance date must be a date on or after a date which is two years after the effective date of the applicable minimum energy efficiency requirement

[23] AHRI's certification database for AHRI 1060 ratings certifies product performance calculation software.

in the amended ASHRAE Standard 90.1. (42 U.S.C. 6313(a)(6)(D)(i)) With respect to large and very large commercial package air conditioning and heating equipment, the initial compliance date must be a date on or after a date which is three years after the effective date of the applicable minimum energy efficiency requirement in the amended ASHRAE Standard 90.1. (42 U.S.C. 6313(a)(6)(D)(ii))

If DOE were to prescribe standards more stringent than the efficiency levels contained in ASHRAE Standard 90.1–2019, EPCA dictates that any such standard will become effective for equipment manufactured on or after a date which is four years after the date of publication of a final rule in the **Federal Register**. (42 U.S.C. 6313(a)(6)(D))

Moreover, there currently is not a DOE test procedure for DX–DOASes, and DOE has proposed a test procedure that relies on the metrics ISCOP2 and ISMRE2 in the July 2021 Test Procedure NOPR. 86 FR 36018. Were DOE to adopt the proposed test procedure, beginning 360 days following the final test procedure rule, manufacturers would be prohibited from making representations respecting the energy consumption of DX–DOASes, unless such equipment has been tested in accordance with such test procedure and such representation fairly discloses the results of such testing. (42 U.S.C. 6314(d)(1))

In this NOPR, DOE is proposing to adopt energy conservation standards for DX–DOASes that are equivalent to those contained in ASHRAE Standard 90.1–2016. Because ASHRAE Standard 90.1–2016 established equipment classes for DX–DOASes that do not distinguish units based on the small, large, or very large categories, DOE has tentatively decided to assign a single compliance date regardless of equipment size and apply the three-year lead time.

As previously noted, when establishing energy conservation standards at the same level as in ASHRAE Standard 90.1, DOE must establish such standards no later than 18 months following the ASHRAE Standard 90.1 update, and manufacturers must comply with such standards 2 to 3 years after the ASHRAE Standard 90.1 update, depending on the size of the equipment. (42 U.S.C. 6313(a)(6)(A)(ii)(I) & (a)(6)(D)) In order to provide DX–DOAS manufacturers with a reasonable lead-time to comply with the proposed standards, DOE proposes that manufacturers would be required to comply with the new standards for DX–DOASes 18 months following the publication date of a final rule establishing these standards. The proposed compliance date is consistent with the lead-time following DOE's establishment of standards at ASHRAE Standard 90.1 levels 18 months after the ASHRAE update and manufacturers' compliance with said standards 3 years after the ASHRAE update (*i.e.,* 18 months following publication of a final rule) that is provided for under EPCA.

VII. Procedural Issues and Regulatory Review

A. Review Under Executive Orders 12866 and 13563

Section 1(b)(1) of Executive Order (''E.O.'') 12866, ''Regulatory Planning and Review,'' 58 FR 51735 (Oct. 4, 1993), requires each agency to identify the problem that it intends to address, including, where applicable, the failures of private markets or public institutions that warrant new agency action, as well as to assess the significance of that problem. The problems that the proposed standards set forth in this NOPR are intended to address are as follows:

(1) Insufficient information and the high costs of gathering and analyzing relevant information leads some consumers to miss opportunities to make cost-effective investments in energy efficiency.

(2) In some cases, the benefits of more-efficient equipment are not realized due to misaligned incentives between purchasers and users. An example of such a case is when the equipment purchase decision is made by a building contractor or building owner who does not pay the energy costs.

(3) There are external benefits resulting from improved energy efficiency of appliances and equipment that are not captured by the users of such products. These benefits include externalities related to public health, environmental protection, and national energy security that are not reflected in energy prices, such as reduced emissions of air pollutants and greenhouse gases that impact human health and global warming.

This regulatory action was determined not to be a ''significant regulatory action'' under section 3(f) of Executive Order 12866. Accordingly, DOE has not prepared a regulatory impact analysis for this proposed rule, and the Office of Information and Regulatory Affairs (''OIRA'') in the Office of Management and Budget (''OMB'') has not reviewed this proposed rule.

DOE has also reviewed this proposed regulation pursuant to E.O. 13563, issued on January 18, 2011. 76 FR 3281 (Jan. 21, 2011). E.O. 13563 is supplemental to and explicitly reaffirms the principles, structures, and definitions governing regulatory review established in E.O. 12866. To the extent permitted by law, agencies are required by E.O. 13563 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, OIRA 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 NOPR is consistent with these principles, including the requirement that, to the extent permitted by law, benefits justify costs and that net benefits are maximized.

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 has prepared the following IRFA for the products that are the subject of this proposed rulemaking.

For manufacturers of dehumidifying direct-expansion dedicated outdoor air systems (DX–DOASes), the SBA has set a size threshold, which defines those entities classified as ''small businesses'' for the purposes of the Regulatory Flexibility Act. DOE used the SBA's small business size standards to determine whether any small entities would be subject to the requirements of the rule. (*See* 13 CFR part 121.) The size standards are listed by North American Industry Classification System (NAICS) code and industry description and are available at *www.sba.gov/document/support--table-size-standards.* The equipment covered by this proposed rule are classified under North American Industry Classification System (''NAICS'') code 333415, ''Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing.'' In 13 CFR 121.201, the SBA sets a threshold of 1,250 employees or fewer for an entity to be considered as a small business for this category.

1. Description of Reasons Why Action Is Being Considered

Title III, Part C of EPCA, added by Public Law 95–619, Title IV, section 441(a) (42 U.S.C. 6311–6317, as codified), established the Energy Conservation Program for Certain Industrial Equipment. These products include DX–DOASes, the subject of this proposed rulemaking. EPCA requires DOE to consider amending the existing Federal energy conservation standard for certain types of listed commercial and industrial equipment (generally, commercial water heaters, commercial packaged boilers, commercial air-conditioning and heating equipment, and packaged terminal air conditioners and heat pumps) each time ASHRAE Standard 90.1 is amended with respect to such equipment. (42 U.S.C. 6313(a)(6)(A)) For each type of equipment, EPCA directs that if ASHRAE Standard 90.1 is amended, DOE must adopt amended energy conservation standards at the new efficiency level in ASHRAE Standard 90.1, unless clear and convincing evidence supports a determination that adoption of a more stringent efficiency level as a national standard would produce significant additional energy savings and be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)) This is referred to as ''the ASHRAE trigger.''

2. Objectives of, and Legal Basis for, Rule

In addition to the ASHRAE trigger for energy conservation standards, EPCA also requires that the test procedures for commercial package air conditioning and heating equipment—of which DX–DOASes are a type—be those generally accepted industry testing procedures or rating procedures developed or recognized by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) or by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), as referenced in ASHRAE Standard 90.1, ''Energy Standard for Buildings Except Low-Rise Residential Buildings'' (ASHRAE Standard 90.1). (42 U.S.C. 6314(a)(4)(A)) If such an industry test procedure is amended, the Secretary shall amend the test procedure for the product as necessary to be consistent with the amended industry test procedure or rating procedure unless the Secretary determines, by rule, published in the **Federal Register** and supported by clear and convincing evidence, that to do so would not meet the statutory requirements for test procedures regarding representativeness and burden. (42 U.S.C. 6314(a)(4)(B))

The industry test procedure referenced by ASHRAE Standard 90.1–2019 (the latest version of ASHRAE Standard 90.1) for DX–DOASes is ANSI/AHRI Standard 920–2015, ''Performance Rating of DX-Dedicated Outdoor Air System Units'' (ANSI/AHRI 920–2015). ANSI/AHRI 920–2015 underwent major updates which resulted in a new version of the test procedure released in February 2020: AHRI 920–2020. Due to these test procedure updates, the minimum energy efficiency levels specified for DX–DOASes in ASHRAE Standard 90.1–2019 (which uses the metrics ISMRE and ISCOP) are not based on equipment efficiency as measured pursuant to the latest version of the industry consensus test procedure, AHRI 920–2020 (which uses the metrics ISMRE2 and ISCOP2). As a result, should DOE adopt the test procedure as proposed in the July 2021 TP NOPR, the efficiency measurements from the version of the industry test procedure recognized in ASHRAE Standard 90.1–2019 for DX–DOASes (*i.e.,* ISMRE and ISCOP), would not be comparable to efficiency measurements under the DOE test procedure. DOE would generally be required to adopt the ISMRE and ISCOP levels in ASHRAE Standard 90.1–2019 as the basis for energy conservation standards; however, in the case of an amended test procedure that would alter the measured energy efficiency or measured energy use of a covered ASHRAE equipment, EPCA prescribes requirements to amend the applicable energy conservation standard so that products or equipment that complied under the prior test procedure remain compliant under the amended test procedure. (*See generally* 42 U.S.C. 6293(e); 42 U.S.C. 6314(a)(4)(C))

As such, in this proposed rule, DOE is proposing to adopt minimum efficiency levels using the new metrics established in AHRI 920–2020 at equivalent stringency to those levels currently published in ASHRAE Standard 90.1 (which are in terms of the metrics established in ANSI/AHRI 920–2015). DOE has done so by determining a ''crosswalk,'' or, an equivalent translation, of the metrics.

DOE conducted a crosswalk informed by the crosswalk procedure established in EPCA and required for amended test procedures that result in changes to the measured energy efficiency or energy use as compared to the existing DOE test procedure. (*See* 42 U.S.C. 6293(e); 42 U.S.C. 6314(a)(4)(C)) This EPCA crosswalk provision is not applicable in the present case as there is not an existing DOE test procedure for DX–DOASes; however, DOE found it to be instructive for determining standards using the ISMRE2 and ISCOP2 metrics that are of equivalent stringency as the levels specified in ASHRAE Standard 90.1–2019. The crosswalk approach relied on by DOE in this NOPR used an average difference in measured energy efficiency between ANSI/AHRI 920–2015 (which relies on ISMRE and ISCOP) and AHRI 920–2020 (which relies on ISMRE2 and ISCOP2).

3. Description on Estimated Number of Small Entities Regulated

For manufacturers of small, large, and very large air-conditioning and heating equipment (including DX–DOASes), commercial warm-air furnaces, and commercial water heaters, the Small Business Administration (SBA) has set a size threshold which defines those entities classified as ''small businesses''. DOE used the SBA's small business size standards to determine whether any small entities would be subject to the requirements of this rule. *See* 13 CFR part 121. The equipment covered by this rule are classified under North American Industry Classification

System (NAICS) code 333415,[24] ''Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing.'' In 13 CFR 121.201, the SBA sets a threshold of 1,250 employees or fewer for an entity to be considered as a small business for this category.

In reviewing the DX–DOAS market, DOE used company websites, marketing research tools, product catalogues, and other public information to identify companies that manufacture DX–DOASes. DOE identified 12 original equipment manufacturers (''OEMs'') of DX–DOASes affected by this rulemaking. DOE screened out companies that do not meet the definition of ''small business'' or are foreign-owned and operated. DOE used subscription-based business information tools to determine headcount, revenue, and geographic presence of the small businesses. Out of these 12 OEMs, DOE determined that there is one domestic small manufacturer. DOE understands the annual revenue of the small manufacturer to be approximately $66 million.

Issue–6: DOE requests comment and information on the number of small, domestic OEMs of the DX–DOASes.

4. Description and Estimate of Compliance Requirements Including Differences in Cost, if Any, for Different Groups of Small Entities

The proposed standards for DX–DOASes were determined by a crosswalk of the ASHRAE Standard 90.1–2019 efficiency levels to new efficiency metrics defined in AHRI 920–2020. As noted in Section 2 of the Review Under the Regulatory Flexibility Act, the crosswalk was based on the average difference in efficiency under the amended test procedure. While DOE expects it to be unlikely, some models currently on the market that are minimally compliant with ASHRAE Standard 90.1–2019 may not meet the crosswalked levels, since some units will fall above the average and some units will fall below the average. At this time, identification of such models is not possible due lack of data, as manufacturers do not publish sufficient model performance information.

The proposed adoption of the crosswalked ASHRAE level may require small manufacturers to redesign a portion of equipment offerings. However, adopting more stringent standards above the cross-walked ASHRAE levels would lead to higher costs to manufacturers. Therefore, DOE determined that the proposed efficiency level provides the least cost option for small manufacturers.

Issue–7: DOE requests comment on the potential number of basic models that small, domestic OEMs would need to redesign and the costs associated with the redesign process. Further, DOE request comments on its conclusion that adopting levels other than ASHRAE would lead to higher costs for small manufacturers.

5. Duplication, Overlap, and Conflict With Other Rules and Regulations

DOE is not aware of any rules or regulations that duplicate, overlap, or conflict with the proposed rule being considered in this action.

6. Significant Alternatives to the Rule

As EPCA requires DOE to either adopt the ASHRAE levels or to propose higher standards, DOE is limited in options to mitigate impacts to small businesses. In this proposed rulemaking, DOE is adopting the ASHRAE levels (cross-walked to metrics adopted in the DX–DOAS test procedure), which is the least cost option to industry.

Additional compliance flexibilities may be available through other means. EPCA provides that a manufacturer whose annual gross revenue from all of its operations does not exceed $8 million may apply for an exemption from all or part of an energy conservation standard for a period not longer than 24 months after the effective date of a final rule establishing the standard. (42 U.S.C. 6295(t)) Additionally, manufacturers subject to DOE's energy efficiency standards may apply to DOE's Office of Hearings and Appeals for exception relief under certain circumstances. Manufacturers should refer to 10 CFR part 430, subpart E, and 10 CFR part 1003 for additional details.

C. Review Under the Paperwork Reduction Act

Under the procedures established by the Paperwork Reduction Act of 1995 (PRA), a person is not required to respond to a collection of information by a Federal agency unless that collection of information displays a currently valid OMB Control Number.

OMB Control Number 1910–1400, Compliance Statement Energy/Water Conservation Standards for Appliances, is currently valid and assigned to the certification reporting requirements applicable to covered equipment, including DX–DOASes.

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

Certification data will be required for DX–DOASes; however, DOE is not proposing certification or reporting requirements for DX–DOASes in this NOPR. Instead, DOE may consider proposals to establish certification requirements and reporting for DX–DOASes under a separate rulemaking regarding appliance and equipment certification. DOE will address changes to OMB Control Number 1910–1400 at that time, as necessary.

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

D. Review Under the National Environmental Policy Act of 1969

DOE is analyzing this proposed regulation 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 rulemakings that establish energy conservation standards for consumer products or industrial equipment. 10 CFR part 1021, subpart D, appendix B5.1. DOE anticipates that this rulemaking qualifies for categorical exclusion B5.1

[24] The business size standards are listed by NAICS code and industry description and are available at: *www.sba.gov/document/support--table-size-standards* (Last Accessed July 29th, 2021).

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

E. Review Under Executive Order 13132

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

F. Review Under Executive Order 12988

With respect to the review of existing regulations and the promulgation of new regulations, section 3(a) of E.O. 12988, ''Civil Justice Reform,'' 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 Executive Order 12988 requires executive agencies to review regulations in light of applicable standards in section 3(a) and section 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, this proposed rule meets the relevant standards of E.O. 12988.

G. Review Under the Unfunded Mandates Reform Act of 1995

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

This proposed rule does not contain a Federal intergovernmental mandate, nor is it expected to require expenditures of $100 million or more in any one year by the private sector. In this document, DOE is proposing to adopt energy conservation standards at an equivalent stringency level as the existing industry standards in ASHRAE Standard 90.1–2019. The determination of the proposed energy conservation standards is based on a crosswalk of the ASHRAE Standard 90.1–2019 minimum efficiency levels to updated efficiency metrics, and thus DOE does not expect that units which are minimally compliant with ASHRAE Standard 90.1–2019 would require redesign. As a result, the analytical requirements of UMRA do not apply.

H. 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 proposed rule would not result in any takings that might require compensation under the Fifth Amendment to the U.S. Constitution.

I. Review Under Executive Order 13211

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

DOE has tentatively concluded that this regulatory action, which proposes new energy conservation standards for DX–DOASes, is not a significant energy action because this action is not a significant regulatory action under Executive Order 12866, the proposed standards are not likely to 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 proposed rule.

J. 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 (January 14, 2005). The Bulletin establishes that certain scientific information shall be peer reviewed by qualified specialists before it is disseminated by the Federal Government, including influential scientific information related to agency regulatory actions. The purpose of the bulletin is to enhance the quality and credibility of the Government's scientific information. Under the Bulletin, the energy conservation standards rulemaking analyses are ''influential scientific information,'' which the Bulletin defines as ''scientific information the agency reasonably can determine will have, or does have, a clear and substantial impact on important public policies or private sector decisions.'' 70 FR 2664, 2667.

In response to OMB's Bulletin, DOE conducted formal peer reviews of the energy conservation standards development process and the analyses that are typically used and has prepared a report describing that peer review.[25] 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. DOE has determined that the peer-reviewed analytical process continues to reflect current practice, and the Department followed that process for developing energy conservation standards in the case of the present rulemaking.

K. Review Under Section 32 of the Federal Energy Administration Act of 1974

Under section 301 of the Department of Energy Organization Act (Pub. L. 95–91; 42 U.S.C. 7101), DOE must comply with section 32 of the Federal Energy Administration Act of 1974, as amended by the Federal Energy Administration Authorization Act of 1977. (15 U.S.C. 788; ''FEAA'') Section 32 essentially provides in relevant part that, where a proposed rule authorizes or requires use of commercial standards, the notice of proposed rulemaking must inform the public of the use and background of such standards. In addition, section 32(c) requires DOE to consult with the Attorney General and the Chairman of the Federal Trade Commission (''FTC'') concerning the impact of the commercial or industry standards on competition.

The proposed energy conservation standards for DX–DOASes would incorporate the following commercial standards: AHRI 920–2020 and AHRI 1060–2018. DOE has evaluated these standards and is unable to conclude whether they fully comply with the requirements of section 32(b) of the FEAA (*i.e.,* whether it was developed in a manner that fully provides for public participation, comment, and review). DOE will consult with both the Attorney General and the Chairman of the FTC concerning the impact of these test procedures on competition, prior to prescribing a final rule.

L. Description of Materials Incorporated by Reference

In this NOPR, DOE proposes to incorporate by reference the following industry standards:

(1) The test standard published by AHRI, titled ''2020 Standard for Performance Rating of DX-Dedicated Outdoor Air System Units,'' AHRI Standard 920–2020 (I–P). AHRI Standard 920–2020 (I–P) is an industry-accepted test procedure for measuring the performance of dehumidifying direct-expansion dedicated outdoor air system units (DX–DOASes). AHRI Standard 920–2020 (I–P) is available on AHRI's website at: *www.ahrinet.org/App_Content/ahri/files/STANDARDS/AHRI/AHRI_Standard_920_I-P_2020.pdf.*

(2) The test standard published by AHRI, titled ''2018 Standard for Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment,'' ANSI/AHRI Standard 1060–2018. ANSI/AHRI Standard 1060–2018 is an industry-accepted test procedure for measuring the performance of air-to-air exchangers for energy recovery ventilation equipment (VERS). ANSI/AHRI Standard 1060–2018 is available on AHRI's website at: *www.ahrinet.org/App_Content/ahri/files/STANDARDS/AHRI/AHRI_Standard_1060_I-P_2018.pdf.*

VIII. Public Participation

A. Participation in the Webinar

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

B. Procedure for Submitting Prepared General Statements for Distribution

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

Persons requesting to speak should briefly describe the nature of their interest in this rulemaking and provide a telephone number for contact. DOE requests persons selected to make an oral presentation to submit an advance copy of their statements at least two weeks before the webinar. At its discretion, DOE may permit persons who cannot supply an advance copy of their statement to participate, if those persons have made advance alternative arrangements with the Building Technologies Office. As necessary, requests to give an oral presentation should ask for such alternative arrangements.

C. Conduct of the Webinar

DOE will designate a DOE official to preside at the webinar and may also use a professional facilitator to aid discussion. The meeting will not be a judicial or evidentiary-type public hearing, but DOE will conduct it in accordance with section 336 of EPCA (42 U.S.C. 6306). A court reporter will be present to record the proceedings and prepare a transcript. DOE reserves the right to schedule the order of presentations and to establish the

[25] The 2007 ''Energy Conservation Standards Rulemaking Peer Review Report'' is available at the following website: *www.energy.gov/eere/buildings/downloads/energy-conservation-standards-rulemaking-peer-review-report-0* (Last accessed August 6, 2021).

procedures governing the conduct of the webinar. There shall not be discussion of proprietary information, costs or prices, market share, or other commercial matters regulated by U.S. anti-trust laws. After the webinar and until the end of the comment period, interested parties may submit further comments on the proceedings and any aspect of the proposed rulemaking.

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

At the end of all prepared statements on a topic, DOE will permit participants to clarify their statements briefly. Participants should be prepared to answer questions by DOE and by other participants concerning these issues. DOE representatives may also ask questions of participants concerning other matters relevant to this rulemaking. The official conducting the webinar will accept additional comments or questions from those attending, as time permits. The presiding official will announce any further procedural rules or modification of the above procedures that may be needed for the proper conduct of the webinar.

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

D. Submission of Comments

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

Submitting comments via www.regulations.gov. The *www.regulations.gov* web page will require you to provide your name and contact information. Your contact information will be viewable to DOE Building Technologies staff only. Your contact information will not be publicly viewable except for your first and last names, organization name (if any), and submitter representative name (if any). If your comment is not processed properly because of technical difficulties, DOE will use this information to contact you. If DOE cannot read your comment due to technical difficulties and cannot contact you for clarification, DOE may not be able to consider your comment.

However, your contact information will be publicly viewable if you include it in the comment itself or in any documents attached to your comment. Any information that you do not want to be publicly viewable should not be included in your comment, nor in any document attached to your comment. Otherwise, persons viewing comments will see only first and last names, organization names, correspondence containing comments, and any documents submitted with the comments.

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

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

Submitting comments via email. Comments and documents submitted via email also will be posted to *www.regulations.gov.* If you do not want your personal contact information to be publicly viewable, do not include it in your comment or any accompanying documents. Instead, provide your contact information in a cover letter. Include your first and last names, email address, telephone number, and optional mailing address. The cover letter will not be publicly viewable as long as it does not include any comments.

Include contact information each time you submit comments, data, documents, and other information to DOE. No telefacsimiles (''faxes'') will be accepted.

Comments, data, and other information submitted to DOE electronically should be provided in PDF (preferred), Microsoft Word or Excel, or text (ASCII) file format. Provide documents that are not secured, that are written in English, and that are free of any defects or viruses. Documents should not contain special characters or any form of encryption and, if possible, they should carry the electronic signature of the author.

Campaign form letters. Please submit campaign form letters by the originating organization in batches of between 50 to 500 form letters per PDF or as one form letter with a list of supporters' names compiled into one or more PDFs. This reduces comment processing and posting time.

Confidential Business Information. Pursuant to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email two well-marked copies: One copy of the document marked ''confidential'' including all the information believed to be confidential, and one copy of the document marked ''non-confidential'' with the information believed to be confidential deleted. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

It is DOE's policy that all comments may be included in the public docket, without change and as received, including any personal information provided in the comments (except information deemed to be exempt from public disclosure).

E. 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 NOPR under the OMB and DOE guidelines and has concluded that it is consistent with applicable policies in those guidelines.

F. Issues on Which DOE Seeks Comment

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

Issue–1: DOE requests comment on the proposed eight equipment classes for energy conservation standards of DX–DOASes.

Issue–2: DOE continues to seek information that may inform a market and technology assessment for the DX–DOAS industry, including data on technology options which may increase the ISMRE2 and/or ISCOP2 efficiencies of DX–DOASes.

Issue–3: DOE requests comment on the proposed minimum ISMRE2 and ISCOP2 standards for DX–DOASes, as well as comment on any aspect of its crosswalk analysis, which is detailed in the CASD. DOE continues to seek information which compares ISMRE and ISCOP ratings to ISMRE2 and ISCOP2 ratings for the DX–DOASes that are representative of the market baseline efficiency level.

Issue–4: DOE seeks feedback on the proposed representation requirement regarding MRC.

Issue–5: DOE requests comment on its proposed DX–DOAS-specific enforcement provisions, and in particular, the appropriateness of the proposed tolerances on certified values.

Issue–6: DOE requests comment and information on the number of small, domestic OEMs of the DX–DOASes.

Issue–7: DOE requests comment on the potential number of basic models that small, domestic OEMs would need to redesign and the costs associated with the redesign process. Further, DOE request comments on its conclusion that adopting levels other than ASHRAE would lead to higher costs for small manufacturers.

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

IX. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this notice of proposed rulemaking and request for comment.

List of Subjects

10 CFR Part 429

Administrative practice and procedure, Confidential business information, Energy conservation, Household appliances, Incorporation by reference, Reporting and recordkeeping requirements.

10 CFR Part 431

Administrative practice and procedure, Confidential business information, Energy conservation test procedures, Reporting and recordkeeping requirements.

Signing Authority

This document of the Department of Energy was signed on January 19, 2022, by Kelly J. Speakes-Backman, 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 January 20, 2022.

Treena V. Garrett,

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

For the reasons stated in the preamble, DOE is proposing to amend parts 429 and 431 of Chapter II of Title 10, Code of Federal Regulations as set forth below:

PART 429—CERTIFICATION, COMPLIANCE, AND ENFORCEMENT FOR CONSUMER PRODUCTS AND COMMERCIAL AND INDUSTRIAL EQUIPMENT

■ 1. The authority citation for part 429 continues to read as follows:

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

■ 2. Amend § 429.4 by:
■ a. Revising paragraph (a) and the introductory text to paragraph (c);
■ b. Redesignating paragraph (c)(2) as (4); and
■ c. Adding new paragraphs (c)(2) and (3).

The revision and additions read as follows:

§ 429.4 Materials incorporated by reference.

(a) Certain material is incorporated by reference into this subpart with the approval of the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, DOE must publish a document in the **Federal Register** and the material must be available to the public. All approved material is available for inspection at the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, Sixth Floor, 950 L'Enfant Plaza SW, Washington, DC 20024, (202) 586–2945, *https://www.energy.gov/eere/buildings/appliance-and-equipment-standards-program,* and may be obtained from the other sources in this section. Also, this material is available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email: *fr.inspection@nara.gov,* or go to: *www.archives.gov/federal-register/cfr/ibr-locations.html.*

* * * * *

(c) *AHRI.* Air-Conditioning, Heating, and Refrigeration Institute, 2311 Wilson Blvd., Suite 400, Arlington, VA 22201, (703) 524–8800, or go to: *www.ahrinet.org.*

* * * * *

(2) AHRI Standard 920–2020 (I–P), (''AHRI 920–2020''), ''2020 Standard for Performance Rating of DX-Dedicated Outdoor Air System Units,'' approved February 4, 2020, IBR approved for § 429.134.

(3) AHRI Standard 1060–2018, (''AHRI 1060–2018''), ''2018 Standard

for Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment,'' approved 2018, (AHRI 1060–2018), IBR approved for § 429.134.

* * * * *

■ 3. Amend § 429.43 by reserving paragraph (a)(3) and adding paragraph (a)(4) to read as follows:

§ 429.43 Commercial heating, ventilating, air conditioning (HVAC) equipment.

(a) * * *

(3) [Reserved]

(4) *Product-specific provisions for determination of represented values for dehumidifying direct-expansion dedicated outdoor air systems.* (i) When certifying, the following provisions apply.

(A) For ratings based on tested samples, the represented value of moisture removal capacity shall be the mean of the moisture removal capacities measured for the units in the sample selected, as described in paragraph (a)(1)(ii) of this section, rounded to the nearest lb/hr multiple according to Table 3 of AHRI 920–2020 (incorporated by reference; see § 429.4).

(B) For ratings based on an AEDM, the represented value of moisture removal capacity shall be the moisture removal capacity output simulated by the AEDM, as described in paragraph (a)(2) of this section, rounded to the nearest lb/hr multiple according to Table 3 of AHRI 920–2020.

(ii) [Reserved]

* * * * *

■ 4. Amend § 429.134 by adding paragraph (s) to read as follows:

§ 429.134 Product-specific enforcement provisions.

* * * * *

(s) *Dehumidifying direct-expansion dedicated outdoor air systems (DX–DOASes) with ventilation energy recovery systems (VERS).* (1) If the manufacturer certified testing in accordance with Option 1 using default VERS exhaust air transfer ratio (EATR) values or Option 2 using default VERS effectiveness and EATR values, DOE may determine the integrated seasonal moisture removal efficiency 2 (ISMRE2) and/or the integrated seasonal coefficient of performance 2 (ISCOP2) using the default values or by conducting testing to determine VERS performance according to AHRI 1060–2018 (incorporated by reference, see § 429.4) (with the minimum purge angle and zero pressure differential between supply and return air).

(2) If the manufacturer certified testing in accordance with Option 1 using VERS exhaust air transfer ratio (EATR) values or Option 2 using VERS effectiveness and EATR values determined using an analysis tool certified in accordance with AHRI 1060–2018, DOE may conduct its own testing to determine VERS performance in accordance with AHRI 1060–2018.

(i) DOE would use the values of VERS performance certified to DOE (*i.e.* EATR, sensible effectiveness, and latent effectiveness) as the basis for determining the ISMRE2 and/or ISCOP2 of the basic model only if, for Option 1, the certified EATR is found to be no more than one percentage point less than the mean of the measured values (*i.e.* the difference between the measured EATR and the certified EATR is no more than 0.01), or for Option 2, all certified values of sensible effectiveness are found to be no greater than 105 percent of the mean of the measured values (*i.e.* the certified effectiveness divided by the measured effectiveness is no greater than 1.05), all certified values of latent effectiveness are found to be no greater than 107 percent of the mean of the measured values, and the certified EATR is found to be no more than one percentage point less than the mean of the measured values.

(ii) If any of the conditions in paragraph (s)(2)(i) of this section do not hold true, then the mean of the measured values will be used as the basis for determining the ISMRE2 and/or ISCOP2 of the basic model.

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

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

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

■ 6. Amend § 431.97 by adding paragraph (g) and Table 14 to read as follows:

§ 431.97 Energy efficiency standards and their compliance dates.

* * * * *

(g) Each dehumidifying direct-expansion dedicated outdoor air system manufactured on or after the compliance date listed in this table must meet the applicable minimum energy efficiency standard level(s) set forth in this section.

TABLE 14 TO § 431.97—MINIMUM EFFICIENCY STANDARDS FOR DEHUMIDIFYING DIRECT-EXPANSION DEDICATED OUTDOOR AIR SYSTEMS

Equipment type	Subcategory	Efficiency level	Compliance date: Equipment manufactured starting on . . .
Dehumidifying direct-expansion dedicated outdoor air systems.	(AC)—Air-cooled without ventilation energy recovery systems.	ISMRE2 = 3.8	*[date 18 months after the publication of a standards final rule].*
	(AC w/VERS)—Air-cooled with ventilation energy recovery systems.	ISMRE2 = 5.0	*[date 18 months after the publication of a standards final rule].*
	(ASHP)—Air-source heat pumps without ventilation energy recovery systems.	ISMRE2 = 3.8 ..... ISCOP2 = 2.05	*[date 18 months after the publication of a standards final rule].*
	(ASHP w/VERS)—Air-source heat pumps with ventilation energy recovery systems.	ISMRE2 = 5.0 ..... ISCOP2 = 3.20	*[date 18 months after the publication of a standards final rule].*
	(WC)—Water-cooled without ventilation energy recovery systems.	ISMRE2 = 4.7	*[date 18 months after the publication of a standards final rule].*
	(WC w/VERS)—Water-cooled with ventilation energy recovery systems.	ISMRE2 = 5.1	*[date 18 months after the publication of a standards final rule].*
	(WSHP)—Water-source heat pumps without ventilation energy recovery systems.	ISMRE2 = 3.8 ..... ISCOP2 = 2.13	*[date 18 months after the publication of a standards final rule].*

TABLE 14 TO § 431.97—MINIMUM EFFICIENCY STANDARDS FOR DEHUMIDIFYING DIRECT-EXPANSION DEDICATED OUTDOOR AIR SYSTEMS—Continued

Equipment type	Subcategory	Efficiency level	Compliance date: Equipment manufactured starting on . . .
	(WSHP w/VERS)—Water-source heat pumps with ventilation energy recovery systems.	ISMRE2 = 4.6 ..... ISCOP2 = 4.04	*[date 18 months after the publication of a standards final rule].*

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