[6450-01-P]

DEPARTMENT OF ENERGY

10 CFR Part 430

[Docket Number EERE-2014-BT-STD-0059]

Energy Conservation Program: Energy Conservation Standards for Room Air Conditioners; Request for Information

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

ACTION: Request for Information (RFI).

SUMMARY: The U.S. Department of Energy (DOE) is initiating an effort to determine whether to amend the current energy conservation standards for room air conditioners (room ACs). According to the Energy Policy and Conservation Act's 6-year review requirement, DOE must publish by April 8, 2017 a notice of proposed rulemaking (NOPR) to propose new standards for room ACs or a notice of determination that the existing standards do not need to be amended. This RFI seeks to solicit information from the public to help DOE determine whether amended standards for room ACs would result in a significant amount of additional energy savings and whether those standards would be technologically feasible and economically justified. In addition, DOE has identified several issues associated with the currently applicable test

procedure for room ACs on which DOE is particularly interested in receiving comment.

DATES: Written comments and information are requested on or before **[INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: Interested parties are encouraged to submit comments electronically. However, comments may be submitted by any of the following methods:

- Federal eRulemaking Portal: www.regulations.gov. Follow the instructions for submitting comments.
- E-mail: RoomAC2014STD0059@ee.doe.gov. Include docket number EERE-2014-BT-STD-0059 in the subject line of the message. All comments should clearly identify the name, address, and, if appropriate, organization of the commenter. Submit electronic comments in Word Perfect, Microsoft Word, PDF, or ASCII file format, and avoid the use of special characters or any form on encryption.
- Postal Mail: Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Office, Mailstop EE-5B, Request for Information for Energy Conservation Standards for Room Air Conditioners, Docket No. EERE-2014-BT-STD-0059, 1000 Independence Avenue, SW., Washington, DC 20585-0121. Please submit one signed paper original.
- Hand Delivery/Courier: Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Office, Sixth Floor, 950 L'Enfant Plaza, SW., Washington, DC 20024. Please submit one signed paper original.

Instructions: All submissions received must include the agency name and docket number

for this rulemaking. No telefacsimiles (faxes) will be accepted.

Docket: The docket is available for review at www.regulations.gov, including Federal Register notices, comments, and other supporting documents/materials. 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.

A link to the docket webpage can be found at: http://www.regulations.gov/#!docketDetail;D=EERE-2014-BT-STD-0059. This webpage contains a link to the docket for this notice on the www.regulations.gov website. The www.regulations.gov webpage contains simple instructions on how to access all documents, including public comments, in the docket.

FOR FURTHER INFORMATION CONTACT: Direct requests for additional information may be sent to:

Mr. Bryan Berringer, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, EE–5B, 1000 Independence Avenue, SW., Washington, DC 20585–0121. Telephone: 202–586-0371. E-mail: room_air_conditioners@ee.doe.gov

Ms. Sarah Butler, U.S. Department of Energy, Office of the General Counsel, GC-33, 1000 Independence Avenue, SW., Washington, DC 20585-0121. Telephone: (202) 586-1777. E-

mail: Sarah.Butler@hq.doe.gov.

For information on how to submit or review public comments, contact Ms. Brenda Edwards, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, Mailstop EE-5B, 1000 Independence Avenue, SW., Washington, DC 20585-0121. Telephone: (202) 586-2945. E-mail: Brenda.Edwards@ee.doe.gov.

SUPPLEMENTARY INFORMATION:

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I. Introduction

A. Authority and Background

Title III, Part B[1] of the Energy Policy and Conservation Act of 1975 (EPCA or the Act), Pub. L. 94-163, (42 U.S.C. 6291–6309, as codified) sets forth a variety of provisions designed to improve energy efficiency and established the Energy Conservation Program for Consumer Products Other Than Automobiles, a program covering major household appliances (collectively referred to as "covered products"), including room ACs.[2] EPCA authorizes DOE to establish technologically feasible, economically justified energy conservation standards for covered products that would be likely to result in significant national energy savings. (42 U.S.C. 6295(o)(2)(B)(i)(I)–(VII))

The National Appliance Energy Conservation Act of 1987 (NAECA), Pub. L. No. 100-12, amended EPCA to establish prescriptive standards for room ACs manufactured on or after January 1, 1990, and directed DOE to conduct two cycles of rulemakings to determine if more stringent standards were justified. (42 U.S.C. 6295(c)(1)–(2))

DOE undertook the first cycle of these rulemakings and published a final rule on September 24, 1997 (hereafter the September 1997 Final Rule), revising the energy conservation

[1] For editorial reasons, upon codification in the U.S. Code, Part B was re-designated Part A.
[2] All references to EPCA in this document refer to the statute as amended through the Energy Efficiency Improvement Act of 2015, Pub. L. 114-11 (April 30, 2015).

standards for room ACs manufactured on or after October 1, 2000. 62 FR 50122. For the second cycle of rulemakings, DOE published a direct final rule on April 21, 2011 (hereafter the April 2011 Direct Final Rule), amending the energy conservation standards for room ACs manufactured on or after April 21, 2014. 76 FR 22454. DOE published a final rule amending the compliance dates for energy conservation standards for residential room air conditioners. 76 FR 52852 (Aug. 24, 2011). In a separate notice, also on August 24, 2011, DOE confirmed the adoption of these energy conservation standards in a notice of effective date and compliance dates for the direct final rule published on August 24, 2011 (76 FR 52854), which also adopted compliance dates which were set forth in a proposed rule published on May 9, 2011 (76 FR 26656). The current energy conservation standards apply to room ACs manufactured on or after June 1, 2014.

EPCA requires that, not later than 6 years after the issuance of a final rule establishing or amending a standard, DOE publish a NOPR proposing new standards or a notice of determination that the existing standards do not need to be amended. (42 U.S.C. 6295(m)(1)) Based on this provision, DOE must publish by April 8, 2017, either a NOPR proposing amended standards for room ACs or a notice of determination that the existing standards do not need to be amended. This notice represents the initiation of the mandatory review process imposed by EPCA and seeks input from the public to assist DOE with its determination on whether amended standards pertaining to room ACs are warranted. In making this determination, DOE must evaluate whether more stringent standards would (1) yield a significant savings in energy use and (2) be both technologically feasible and economically justified. (42 U.S.C. 6295(o)(3)(B))

B. Rulemaking Process

DOE must follow specific statutory criteria for prescribing new or amended standards for covered products. EPCA requires that any new or amended energy conservation standard be designed to achieve the maximum improvement in energy or water efficiency that is technologically feasible and economically justified. To determine whether a standard is economically justified, EPCA requires that DOE determine whether the benefits of the standard exceed its burdens by considering, to the greatest extent practicable, the following:

1. The economic impact of the standard on the manufacturers and consumers of the affected products;

2. The savings in operating costs throughout the estimated average life of the product compared to any increases in the initial cost, or maintenance expense;

3. The total projected amount of energy and water (if applicable) savings likely to result directly from the imposition of the standard;

4. Any lessening of the utility or the performance of the products likely to result from the imposition of 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 imposition of 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. 6295 (o)(2)(B)(i))

DOE fulfills these and other applicable requirements by conducting a series of analyses throughout the rulemaking process. Table I.1 shows the individual analyses that are performed to

satisfy each of the requirements within EPCA.

Table I.1 EPCA Requirements and Corresponding DOE Analysis

EPCA Requirement	Corresponding DOE Analysis
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 • Shipments Analysis
2. Lifetime operating cost savings compared to increased cost for the product	• 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	• Emissions Analysis • Utility Impact Analysis • Employment Impact Analysis • Monetization of Emission Reductions Benefits • Regulatory Impact Analysis

As detailed throughout this RFI, DOE is specifically publishing this notice as the first step in the analysis process and is specifically requesting input and data from interested parties to aid in the development of the technical analyses.

II. Request for Information and Comments

In the next section, DOE has identified a variety of questions that DOE would like to receive input on to aid in the development of the technical and economic analyses regarding whether new standards for room ACs may be warranted. In addition, DOE welcomes comments on other issues relevant to the conduct of this rulemaking that may not specifically be identified in this notice.

A. Products Covered by This Rulemaking

DOE defines "room air conditioner" under EPCA as "a consumer product, other than a "packaged terminal air conditioner," which is powered by a single phase electric current and which is an encased assembly designed as a unit for mounting in a window or through the wall for the purpose of providing delivery of conditioned air to an enclosed space. It includes a prime source of refrigeration and may include a means for ventilating and heating. (10 CFR 430.2) DOE intends to address energy conservation standards for all room ACs.

DOE notes that other consumer products, including portable ACs and residential dehumidifiers, are self-encased, powered by a single phase electric current, refrigeration-based, and provide delivery of conditioned air to an enclosed space. Portable ACs also provide connection through ducting to a window mounting bracket. DOE believes, however, that the requirement in the room AC definition that the encased assembly be designed as a unit for mounting in a window refers to the product in its entirety, and not just to duct connections. For this reason, DOE is not proposing to update the definition of "room air conditioner" to exclude other consumer products.

DOE is aware that room ACs may provide additional consumer-oriented functions besides cooling, heating, and ventilation. Certain units may offer an air circulation feature, in which the room air is circulated without the addition of any outside air. In addition, certain units may provide an air cleaning function by means of electrostatic filtration, ultraviolet radiation, or ozone generators. DOE requests feedback from interested parties on the suitability of adding references to air circulation, air cleaning, or other functions to the room air conditioner definition.

Issue A.1 DOE requests comment on the definition of room ACs and the consideration of energy conservation standards for all room ACs.

B. Test Procedure

1. Background

Prior to June 1, 2014, room AC performance was certified using the energy efficiency ratio (EER). EER is expressed in British thermal units (Btu) per watt-hour (Wh), and is the quotient of: (1) the cooling capacity in Btu per hour, divided by: (2) the electrical input power in watts (W). (10 CFR 430.23(f)(2))

The Energy Independence and Security Act of 2007 (EISA 2007), Pub. L. 110-140, amended EPCA to require that standby mode and off mode energy consumption be integrated into the overall energy efficiency, energy consumption, or other energy descriptor unless the Secretary determines that (i) the current test procedures for a covered product already fully account for and incorporate standby mode and off mode energy consumption of the covered product; or (ii) such an integrated test procedure is technically infeasible for a particular covered product, in which case the Secretary shall prescribe a separate standby mode and off mode energy use test procedure for the covered product, if technically feasible. (42 U.S.C. 6295(gg)(2)(A))

On January 6, 2011, DOE published in the Federal Register a final rule for a room air AC test procedure rulemaking (January 2011 RAC TP Final Rule), in which DOE determined it is technically feasible to incorporate standby mode and off mode energy consumption into overall energy consumption. As a result, DOE adopted new methods to calculate room AC standby and off mode energy use and the new measure of energy efficiency, Combined Energy Efficiency Ratio (CEER), that integrates standby and off mode energy use with the active mode energy use.

76 FR 972, 991–992 (Jan. 6, 2011)

In the January 2011 RAC TP Final Rule, DOE incorporated by reference into the room AC test procedures specific clauses from International Electrotechnical Commission (IEC) Standard 62301, "Household electrical appliances–Measurement of standby power", First Edition, 2005-06 (IEC Standard 62301 First Edition) regarding test conditions and test procedures for measuring standby and off mode power consumption. DOE also incorporated definitions of "active mode," "standby mode," and "off mode" that are based on the definitions provided in IEC Standard 62301, "Household electrical appliances–Measurement of standby power", Second Edition, Committee Draft for Vote (IEC Standard 62301 CDV). Further, DOE adopted language to clarify the application of clauses from IEC Standard 62301 First Edition and the mode definitions from IEC Standard 62301 CDV for measuring standby and off mode power consumption. 76 FR 972, 979–987 (Jan. 6, 2011). Also as part of the January 2011 RAC TP Final Rule, DOE amended the room AC test procedure to update the references to industry test standards to the versions applicable at that time: (1) American National Standards Institute (ANSI)/Association of Home Appliance Manufacturers (AHAM) RAC-1-2008, "Room Air Conditioners" (ANSI/AHAM RAC-1-2008);[3] and (2) ANSI/American Society of Heating, Refrigerating, and Air-Conditioning Engineers Standard (ASHRAE) 16-1983 (RA2009), "Method of Testing for Rating Room Air Conditioners and Packaged Terminal Air Conditioners" (ANSI/ASHRAE Standard 16-1983 (RA2009)),[4] respectively. 76 FR 972, 1016–1017 (Jan. 6, 2011).

[3] AHAM standards are available for purchase online at: www.aham.org/ht/d/Store/name/STANDARDS/pid/5132
[4] ASHRAE standards are available for purchase online at: www.techstreet.com/ashrae/

2. Updated Energy Efficiency Metric

On February 25, 2015, DOE published a test procedure NOPR for portable ACs that proposes the use of a revised CEER metric that accounts for energy consumption in each of the identified active, standby, and off modes: cooling mode, heating mode, off-cycle mode, inactive mode, and off mode (hereafter referred to as the February 2015 PAC TP NOPR). 80 FR 10212. As discussed in section II.A of this notice, DOE is requesting input on including definitions for different operating modes in the definitions for room ACs. If such additional modes are included, DOE would also consider whether to revise the current room AC CEER metric to account for the energy use in them. In particular, DOE is interested in feedback on whether to consider including in the room AC CEER metric the same modes proposed for the portable AC metric, because of the similarity between the two products.

As a possible approach, DOE could consider the proposal in the February 2015 PAC TP NOPR, in which average power in each mode would be measured and then individually multiplied by the annual operating hours for its respective mode.

$$AEC_i = P_i \times h_i \times k$$

Where:

AEC_i is the annual energy consumption in each mode, in kilowatt-hours (kWh)/year;

P_i is the average power in each mode, in W;

h_i is the number of annual operating hours in each mode;

i designates the operating mode ("c" cooling, "h" heating, "oc" off-cycle, and "ia" inactive or "om" off mode); and

k is 0.001 kWh/Wh conversion factor for Wh to kWh.

80 FR 10211, 10234 (Feb. 25, 2015).

In order to calculate AEC_i, DOE would need to define the annual operating hours for each mode. The current room AC test procedure specifies 750 hours for active cooling mode, and a total of 5,115 hours for inactive and off mode. (10 CFR part 430 appendix F to subpart B). DOE established these values in the January 2011 RAC TP Final Rule. DOE seeks input on mode hours for the complete set of operating modes that may be defined for room ACs.

To incorporate the new operating modes into a revised CEER metric, the February 2015 PAC TP NOPR proposed defining the new term; "combined cooling mode EER" ($CEER_C$).

$$CEER_C = \frac{ACC}{\left(\frac{AEC_C + AEC_T}{k \times t}\right)}$$

Where:

$CEER_C$ is the combined energy efficiency ratio in cooling mode, in Btu/Wh.

ACC is the adjusted cooling capacity, in Btu/h.

AEC_T is the total annual energy consumption attributed to all modes except cooling and heating, in kWh/year.

t is the number of hours per year, 8,760.

k is 0.001 kWh/Wh conversion factor for watt-hours to kilowatt-hours.

80 FR 10211, 10234 (Feb. 25, 2015).

The $CEER_C$ would be calculated for all units, including those with only cooling function and those with both cooling and heating functions. For units with cooling and heating functions,

the metric would be calculated assuming heating mode is not used and therefore, the operating hours that would have been attributed to heating mode and other associated operating modes during the heating season would be neglected. In the February 2015 PAC TP NOPR, DOE proposed that the resulting $CEER_C$ is a meaningful metric for portable ACs without a heating function, and a basis for comparing cooling mode efficiency for units that include heating function, as well as a metric that could be compared to other cooling products, such as room ACs. Id.

To calculate the overall energy efficiency metric for portable ACs without a heating function, the February 2015 PAC TP NOPR proposed that the revised CEER would be directly equal to the unit's calculated $CEER_C$. However, for units with both cooling and heating mode, the revised overall CEER would be calculated as follows.

$$CEER = \frac{ACC \times \left(\frac{h_c}{h_c + h_h}\right) + AHC \times \left(\frac{h_h}{h_c + h_h}\right)}{\left(\frac{AEC_C + AEC_H + AEC_T}{k \times t}\right)}$$

Where:

CEER is the combined energy efficiency ratio, in Btu/Wh.

ACC is the adjusted cooling capacity, in Btu/h.

AHC is the adjusted heating capacity, in Btu/h.

AEC_T is the total annual energy consumption attributed to all modes except cooling and heating, in kWh/year.

h_c and h_h are the cooling and heating mode operating hours, respectively.

t is the number of hours per year, 8,760.

k is 0.001 kWh/Wh conversion factor for watt-hours to kilowatt-hours.

80 FR 10211, 10234–35 (Feb. 25, 2015).

Issue B.1 DOE seeks comment on the merits and/or limitations of revising the room AC test procedure and efficiency metric to account for energy consumption in various modes, which may include cooling mode, heating mode, off-cycle mode, inactive mode, off mode, or others.

Issue B.2 DOE requests data on annual operating hours for the room AC operating modes.

Issue B.3 DOE seeks comment on revising the room AC test procedure to require calculation of $CEER_C$ for all units, including those with only cooling function, and those with both cooling and heating functions.

Issue B.4 DOE seeks comment on revising the definition of CEER for room ACs to be consistent with definitions proposed in the February 2015 PAC TP NOPR.

3. Test Methods for Cooling Mode

The current room AC test procedure specifies that cooling mode performance be tested in accordance with the methods and conditions in ANSI/AHAM RAC-1-2008 and ANSI/ASHRAE 16-1983 (RA2009). (10 CFR part 430, appendix F to subpart B) ANSI/ASHRAE reaffirmed the test standard 16-1983 most recently in 2014. ANSI/ASHRAE 16-1983 (R2014) specifies

measuring cooling performance using a calorimeter method. DOE is aware, however, that ASHRAE is currently undertaking a revision to ANSI/ASHRAE 16-1983 (R2014) that is expected to allow cooling performance to be measured using an air enthalpy method similar to that specified in ANSI/ASHRAE 37-2009 "Methods of Testing for Rating Electrically Driven Unitary Air-Conditioning and Heat Pump Equipment" (ANSI/ASHRAE 37-2009).

Issue B.5 DOE seeks comment on the possible use of an air enthalpy method as an alternative to the current calorimeter method to measure cooling performance in the room AC test procedure.

Issue B.6 DOE requests test data comparing the performance and accuracy of the current calorimeter method to the air enthalpy method being considered in a revision to ANSI/ASHRAE 16-1983 (R2014).

Issue B.7 DOE requests information on the burdens associated with testing cooling performance using an air enthalpy method. Specifically DOE is interested in data related to the required capital investment costs, per-test costs, and testing time associated with air enthalpy testing. DOE is also interested in how these costs compare to those for the existing calorimeter method, and whether the burden for air enthalpy testing would disproportionately impact certain businesses.

4. Test Methods for Heating Mode

If DOE revises the room AC test procedure to require calculation of $CEER_h$ for models

with reverse cycle, DOE would need to define a method for measuring heating performance. DOE is currently evaluating test methods that have been developed (or are proposed) for other residential or light commercial space cooling/heating appliances, such as portable ACs, packaged terminal ACs (PTACs), and packaged terminal heat pumps (PTHPs).

In the February 2015 PAC TP NOPR DOE proposed using an air enthalpy method to measure portable AC heating performance. The proposed method is based on AHAM PAC-1-2014 "Portable Air Conditioners" (AHAM PAC-1), which references test methods established in ANSI/ ASHRAE Standard 37-2009. 80 FR 10211, 10217–10231 (Feb. 25, 2015). For this method, DOE proposed standard rating conditions for the evaporator (room) side and condenser (outdoor) side of dual-duct portable ACs as shown in Table II.1. DOE considers the test conditions in Table II.1 to be the most representative of typical heating mode use for portable ACs, which are likely used as supplemental or low-capacity heaters when a central heating system isn't necessary or operating. DOE notes that the terms "evaporator" and "condenser" refer to the heat exchanger configuration in cooling mode, not the reverse-cycle heating mode.

Table II.1 Standard Rating Conditions for Dual Duct PACs - Heating Mode

Evaporator Inlet Air degrees Fahrenheit (°F) (°Celsius (C))		**Condenser Inlet Air** °F (°C)	
Dry Bulb	**Wet Bulb**	**Dry Bulb**	**Wet Bulb**
70.0 (21.1)	60.0 (15.6)	47.0 (8.33)	43.0 (6.11)

In the current PTAC and PTHP test procedure (10 CFR 431.96), DOE also uses an air enthalpy method to measure heating mode performance. For this test procedure, DOE incorporates by reference in total the American Refrigeration Institute (ARI) Standard 310/380–

2004 "Standard for Packaged Terminal Air-Conditioners And Heat Pumps" (ARI 310/380-2004).[5] ARI 310/380-2004 in turn references ANSI/ASHRAE Standard 58-1999 "Methods of Testing Rating Room Air Conditioner and Packaged Terminal Air Conditioner Heating Capacity" (ANSI/ASHRAE 58-1999) to rate the heating performance of both PTACs and PTHPs. AHR 310/380-2004 specifically notes that "standard ratings relating to cooling capacity and heating capacity shall be net values, including the effects of circulating fan heat, but not including supplementary heat. Standard input ratings shall be the total power input to the compressor(s) and fans, plus controls and other items included as part of the model number(s)." AHR 310/380-2004 provides methods to calculate heat pump heating capacities and energy consumption at both "high-temperature" and "low-temperature" operating conditions, but specifies that EER and coefficient of performance (COP) are only calculated for the high-temperature condition. Table II.2 summarizes the rating conditions for high- and low-temperature conditions.

Table II.2 Standard Rating Conditions for PTHPs and PTACs with Reverse Cycle Capability - Heating Mode

Operating Condition	Evaporator Inlet Air °F (°C)		Condenser Inlet Air °F (°C)	
	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb
High-Temperature	70.0 (21.1)	60.0 (15.6) max	47.0 (8.3)	43.0 (6.1)
Low-Temperature	70.0 (21.1)	60.0 (15.6) max	17.0 (-8.3)	15.0 (-9.4)

Issue B.8 DOE seeks comment on appropriate test methods, external standards, and operating conditions for measuring heating performance in room ACs with reverse cycle.

[5] ARI 310/380-2004 is available online at: www.ari.org/App_Content/ahri/files/standards%20pdfs/ANSI%20standards%20pdfs/ANSI.AHRI.CSA%20Standard%20310_380-2004.pdf

Specifically, DOE seeks comment on the high-temperature operating conditions specified in Table II.2. DOE also welcomes suggestions and supporting data for alternative methods.

Issue B.9 DOE requests information on the burdens associated with testing heating performance, using methods similar to ANSI/ASHRAE 58-1999 or ANSI/ASHRAE 37-2009, or other methods. Specifically DOE is interested in data related to the required capital investment costs, per-test costs, and testing time associate with sound testing. DOE also requests comment on whether this burden would disproportionately impact certain businesses.

5. Test Methods for Part Load Performance

In the January 2011 RAC TP Final Rule, DOE discussed that the test procedure established in that rule does not measure the benefits of technologies that improve part-load performance. 76 FR 972, 1016 (Jan. 6, 2011). The current room AC test procedure measures only the full-load performance at outdoor ambient conditions of 95 ºF dry-bulb and 75 ºF wet-bulb. Therefore, technologies that improve part-load performance, such as multiple-speed compressors and variable-opening expansion devices, will not improve the rated performance of a room AC under the current test procedure. In contrast, central ACs and heat pumps are rated with a seasonal energy efficiency ratio (SEER) descriptor, but the test procedure consists of multiple rating points at different conditions that add time and expense when rating the product.

DOE concluded in the January 2011 RAC TP Final Rule that widespread use of part-load technology in room ACs would not likely be stimulated by the development of a part-load metric at this time, and therefore, the significant effort required to develop an accurate part-load metric

is not likely to be warranted by the expected minimal energy savings. 76 FR 972, 1016 (Jan. 6, 2011.

For the current test procedure rulemaking, DOE again intends to investigate the merits and limitations of revising the current room AC test procedure to account for any benefits of technologies that improve part-load performance. As part of this investigation, DOE expects to research the availability of room ACs on the market in the United States that incorporate variable speed compressors and other components and controls that would enable implementation of part-load operation.

Issue B.10 DOE seeks comment on the merits and/or limitations of revising the current room AC test procedure to account for benefit of technologies that improve part-load performance, and welcomes suggestions and supporting information for test methods that measure part-load operation.

Issue B.11 DOE seeks data and information on the prevalence of room ACs in the U.S. market that are capable of part-load operation.

6. Test Methods for Products that Operate on Multiple Voltages

DOE is aware that there are room ACs available in the United States that can operate on multiple voltages for the input power. These products may have a different capacity measured at each operating voltage. As a result, a single product may be categorized into two different product classes and therefore be required to comply with two different energy conservation

standards, depending on which voltage is used to test the product. Currently, the room AC test procedure does not specify which voltage a product should be tested at, if it is capable of operating with multiple voltages.

Issue B.12 DOE seeks comment on how to test and certify products that may operate on multiple voltages. Specifically, DOE is interested in comment on how to treat products that may be categorized into two different product classes, depending on operating voltage.

7. Test Methods for "Connected Products"

On February 20, 2015, the U.S. Environmental Protection Agency (EPA) published the Final Version 4.0 "ENERGY STAR Product Specification for Room Air Conditioners."[6] Along with revised efficiency criteria, EPA specified an optional connected criteria for room ACs designed to provide enhanced functionality to consumers, such as alerts/messages, remote control, and energy information, as well as new demand response capabilities to support future smart grid interconnection. Products that meet these optional criteria and are certified using a future test method to validate the demand response capabilities could take advantage of a 5-percent energy use allowance for ENERGY STAR rating qualification.

DOE anticipates that the revised ENERGY STAR specification may increase the market penetration of "connected products." It is possible that connected products may consume a significant amount of energy while performing these connected functions. As such, DOE is considering whether to amend the room AC test procedure and energy conservation standards to account for the energy consumed while the product performs connected functions.

[6] Available online at www.energystar.gov/products/spec/room_air_conditioner_specification_version_4_0_pd

Issue B.13 DOE requests information on "connected" room ACs that are already on the market in the United States. Specifically, DOE is interested in the available "connected" features, as well as the energy consumption while these features are active or awaiting commands.

Issue B.14 DOE request information on the current and anticipated market penetration of "connected products."

C. Market and Technology Assessment

The market and technology assessment provides information about the room AC industry that will be used throughout the rulemaking process. For example, this information will be used to determine whether the existing product class structure requires modification based on the statutory criteria for setting such classes and to explore the potential for technological improvements in the design and manufacturing of such products. DOE uses qualitative and quantitative information to characterize the structure of the room AC industry and market. DOE will identify and characterize the manufacturers of room ACs, estimate market shares and trends, address regulatory and non-regulatory initiatives intended to improve energy efficiency or reduce energy consumption, and explore the potential for technological improvements in the design and manufacturing of room ACs. DOE will also review product literature, industry publications, and company websites. Additionally, DOE will consider conducting interviews with manufacturers to assess the overall market for room ACs.

1. Product Classes

As required by EPCA, the criteria for separation into different classes are: (1) type of energy used, or (2) capacity or other performance-related features such as those that provide utility to the consumer or others deemed appropriate by the Secretary that would justify the establishment of a separate energy conservation standard. (42 U.S.C. 6295 (q))

For room ACs, the NAECA amendments to EPCA, initially specified 12 product classes which were applicable to units designed for single-hung or double-hung window installation or through-the-wall installation and based on the following criteria: (1) cooling capacity, in Btu/h; (2) the presence of louvered sides (LS); and (3) the capability of reverse cycle. (42 U.S.C. 6295(c)(1)). In the September 1997 Final Rule, DOE established an updated set of performance standards (effective October 1, 2000) which included four additional product classes. 62 FR 50122 (Sept. 24, 1997). In the April 2011 Direct Final Rule, DOE split Product Classes 5 and 8 into two product classes each. Former Product Class 5 (louvered, non-reverse-cycle, capacity of 20,000 Btu/h and higher) was split into Product Class 5A (louvered, non-reverse-cycle, capacity of 20,000 to 27,999 Btu/h) and Product Class 5B (louvered, non-reverse-cycle, capacity of 28,000 Btu/h and higher). Former Product Class 8 (non-louvered, non-reverse-cycle, capacity of 8,000 to 13,999 Btu/h) was split into Product Class 8A (non-louvered, non-reverse-cycle, capacity of 8,000 to 10,999 Btu/h) and Product Class 8B (non-louvered, non-reverse-cycle, capacity of 11,000 to 13,999 Btu/h). 76 FR 22454 (Apr. 21, 2011). Table II.3 lists the current 18 product classes for room ACs.

Table II.3 Current Room Air Conditioner Product Classes

Without reverse cycle and with louvered sides
1. Less than 6,000 Btu/h
2. 6,000 to 7,999 Btu/h
3. 8,000 to 13,999 Btu/h
4. 14,000 to 19,999 Btu/h
5A. 20,000 to 27,999 Btu/h
5B. 28,000 Btu/h or more
Without reverse cycle and without louvered sides
6. Less than 6,000 Btu/h
7. 6,000 to 7,999 Btu/h
8A. 8,000 to 10,999 Btu/h
8B. 11,000 to 13,999 Btu/h
9. 14,000 to 19,999 Btu/h
10. 20,000 Btu/h or more
With reverse cycle
11. With louvered sides and less than 20,000 Btu/h
12. Without louvered sides and less than 14,000 Btu/h
13. With louvered sides and 20,000 Btu/h or more
14. Without louvered sides and 14,000 Btu/h or more
Casement
15. Casement-Only
16. Casement-Slide

Issue C.1 DOE requests feedback on the current room AC product classes and seeks information regarding any other product classes it should consider for inclusion in its analysis.

2. Technology Assessment

DOE uses information about existing and past technology options and prototype designs to help identify technologies that manufacturers could use to meet and/or exceed energy conservation standards. In consultation with interested parties, DOE intends to develop a list of technologies to consider in its analysis. Initially, this list will include a subset of the technology

options considered during the most recent room AC energy conservation standards rulemaking. These technologies are listed in Table II.4.

DOE is aware that certain technologies listed in Table II.4 may have progressed since the April 2011 Direct Final Rule. Specifically, at the time of that analysis, the room AC industry was responding to the EPA-mandated phase-out of HFC-22 refrigerant. 74 FR 66412, 66418 (Dec. 15, 2009). This rule led to an industry changeover to R-410A refrigerant. Manufacturers expressed concern at the time over the availability of R-410A compressors, stating that production capacity of compressor suppliers had not fully rebounded and compressor suppliers had yet to offer the same range of compressor capacities and efficiency tiers (See chapter 12 of the direct final rule technical support document (TSD).). Consequently, DOE plans to investigate improvements in R-410A compressors that may have come available since the April 2011 Direct Final Rule.

Additionally, in the April 2011 Direct Final Rule, DOE investigated the technological feasibility of the alternative refrigerant R-407C. 76 FR 22490 (April 21, 2011). For this rulemaking, DOE may reevaluate R-407C, as well as other hydrofluorocarbon (HFC) and hydrocarbon (HC) refrigerants.

Furthermore, DOE is aware that three new refrigerants have been approved for use in room air conditioners by the EPA under the Significant New Alternatives Program (SNAP), subject to certain use conditions: R-290, R-441A and R-32. 80 FR 19454 (Apr. 10, 2015). For this rulemaking, DOE plans to investigate the technological feasibility of these refrigerants.

Table II.4 Technology Options for Room Air Conditioners

Increased Heat Transfer Surface Area	**Technology Passed to Screening Analysis in April 2011 Direct Final Rule?**
1. Increased frontal coil area	Yes
2. Increased depth of coil (add tube rows)	Yes
3. Increased fin density	Yes
4. Add subcooler to condenser coil	Yes
Increased Heat Transfer Coefficients	
5. Improved fin design	Yes
6. Improved tube design	Yes
7. Hydrophilic-film coating on fins	Yes
8. Spray condensate onto condenser coil	Yes
9. Microchannel heat exchangers	Yes
Component Improvements	
10. Improved indoor blower and outdoor fan efficiency	Yes
11. Improved blower/fan motor efficiency	Yes
12. Improved compressor efficiency	Yes
Part-Load Technology Improvements	
13. Two-speed, variable-speed, or modulating-capacity compressors	Yes
14. Thermostatic or electronic expansion valves	Yes
15. Thermostatic cyclic controls	Yes
Standby Power Improvements	
16. Switching Power Supply	Yes
Refrigeration System Options	
17. Alternative Refrigerants (R-407C)	No
18. Suction-Line Heat Exchanger	No

Issue C.2 DOE seeks information related to the technologies listed in Table II.4 or other technologies as to their applicability to the current market and how these technologies improve efficiency of room ACs as measured according to the DOE test procedure.

Issue C.3 DOE seeks information related to efficiency improvements in R-410A compressors since the April 2011 Direct Final Rule, their applicability and/or penetration in the current market, and how the compressors improve efficiency of room ACs as measured according to the DOE test procedure.

Issue C.4 DOE seeks information related to the alternative HFC and HC refrigerants, including propane. Specifically, DOE seeks information on the availability of such refrigerants, and, their applicability and/or penetration in the current market, and how these refrigerants improve efficiency of room ACs as measured according to the DOE test procedure.

D. Screening Analysis

The purpose of the screening analysis is to evaluate the technologies that improve equipment efficiency to determine which technologies will be eliminated from further consideration and which will be passed to the engineering analysis for further consideration.

Appendix A to subpart C of Title 10 of the Code of Federal Regulations, Part 430 (10 CFR Part 430), "Procedures, Interpretations and Policies for Consideration of New or Revised Energy Conservation Standards for Consumer Products" (the Process Rule), sets forth procedures to guide DOE in its consideration and promulgation of new or revised equipment energy conservation standards. These procedures elaborate on the statutory criteria provided in 42 U.S.C. 6295(o) and, in part, eliminate problematic technologies early in the process of prescribing or amending an energy efficiency standard. In particular, sections 4(b)(4) and 5(b) of the Process Rule guide DOE in determining whether to eliminate from consideration any

technology that presents unacceptable problems with respect to the following criteria:

(1) **Technological feasibility**. Technologies incorporated in commercial equipment or in working prototypes will be considered technologically feasible.

(2) **Practicability to manufacture, install, and service**. If mass production of a technology in commercial equipment and reliable installation and servicing of the technology could be achieved on the scale necessary to serve the relevant market at the time of the effective date of the standard, then that technology will be considered practicable to manufacture, install, and service.

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

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

Technology options developed in the technology assessment are evaluated against these criteria using DOE analyses and inputs from manufacturers, trade organizations, and energy efficiency advocates. Technologies that pass through the screening analysis are referred to as

"design options" in the engineering analysis. Technology options that fail to meet one or more of the four criteria are eliminated from consideration.

As a part of the screening analysis, DOE has identified three specific consumer-oriented issues that it seeks input on. These issues are weight limits, chassis size limits, and acoustic noise. The following three subsections provide further details on these issues.

1. Weight Limits

In the April 2011 Direct Final Rule analysis DOE limited the total weight of the Product Class 1 (as defined in Table II.3) baseline unit to 50 pounds, to avoid exceeding Occupational Safety and Health Administration (OSHA) and National Institute of Occupational Safety and Health (NIOSH) guidelines for single-person lifting.[7] DOE did not consider limiting the weight of the other analyzed product classes because baseline units in those product classes already exceeded this weight limit.

Issue D.1 DOE seeks input on the merits and/or limitations of maintaining a 50-pound limit for room ACs in Product Class 1. DOE also welcomes suggestions and supporting analysis for alternative weight limits.

Issue D.2 DOE seeks input on whether to consider weight limits for product classes other than Product Class 1 in the room AC analysis. DOE also welcomes suggestions and data for additional product class-specific weight limits.

[7] NIOSH guideline: http://www.cdc.gov/niosh/docs/2007-131/
OSHA guideline: https://www.osha.gov/SLTC/etools/electricalcontractors/materials/heavy.html

2. Chassis Size Limits

In the April 2011 Direct Final Rule analysis, DOE used a methodology that established maximum chassis widths and heights for each product class, when considering a baseline unit. DOE established these limits based on the dimensions of the largest R-410A room AC in each product class on the market. DOE did not set a limit for maximum chassis depth in that analysis.

Issue D.3 DOE seeks input on potentially establishing chassis size limits as part of a design option analysis. DOE also welcomes suggestions and supporting analysis for alternative chassis size limits.

Issue D.4 DOE seeks input on any factors that may help define chassis dimension limits beyond the dimensions of room ACs currently on the market in the United States. Specifically DOE welcomes data on the distribution of window widths and heights in U.S. residences.

3. Acoustic Noise

DOE understands that increased noise levels might occur as room ACs attain higher levels of efficiency. Certain technology options, such as higher speed fans, can facilitate increased heat transfer and improved efficiency, but may result in increased acoustic noise. As a part of the screening analysis, DOE intends to investigate this relationship, specifically as it relates to impacts on consumer utility. As such DOE seeks input on test methods appropriate to objectively evaluate acoustic noise in room ACs.

DOE is aware that the European Union (EU), through its EcoDesign regulations, recently instituted maximum sound power levels for room ACs assessed under EN 12102:2013 "Air Conditioners, liquid chilling packages, heat pumps and dehumidifiers with electrically driven compressors for space heating and cooling – Measurement of airborne noise – Determination of sound power levels" (EN 12102:2013). Under the new EU regulation, room ACs may not exceed indoor sound power levels of 60 decibels (dB)(A) and outdoor sound power levels of 60dB(A).

Similarly, the October 28, 2014 EPA Draft 1 of Version 4.0 "ENERGY STAR Product Specification for Room Air Conditioners"[8] proposed that measured indoor sound power level shall not exceed 60dB(A), as measured using EN 12102:2013. In response to stakeholder comment, the EPA chose to remove the sound performance criteria in its February 20, 2015 Final Version 4.0 of "ENERGY STAR Product Specification for Room Air Conditioners."[9] Stakeholders identified the lack of availability of test chambers and the burden of both building capacity for testing and sound power testing as one barrier to the inclusion of sound performance in an ENERGY STAR specification.

Issue D.5 DOE requests suggestions for test methods that are appropriate to objectively evaluate acoustic noise in room ACs.

[8] Available online at www.energystar.gov/products/spec/room_air_conditioner_specification_version_4_0_pd
[9] Id.

Issue D.6 DOE requests information on the relationship between acoustic noise, in dB(A), or other appropriate units, and consumer satisfaction.

Issue D.7 DOE requests feedback and data on how the design options presented in section II.C impact room AC acoustic noise.

E. Engineering Analysis

The engineering analysis estimates the cost-efficiency relationship of products at different levels of increased energy efficiency ("efficiency levels"). This relationship serves as the basis for the cost-benefit calculations for consumers, manufacturers, and the nation. In determining the cost-efficiency relationship, DOE estimates the change in manufacturer cost associated with increasing the efficiency of products above the baseline, up to the maximum technologically feasible ("max-tech") efficiency level for each product class.

DOE historically has used the following three methodologies to generate incremental manufacturing costs and establish efficiency levels (ELs) for analysis: (1) The design-option approach, which provides the incremental costs of adding to a baseline model design options that will improve its efficiency; (2) the efficiency-level approach, which provides the relative costs of achieving increases in energy efficiency levels, without regard to the particular design options used to achieve such increases; and (3) the cost-assessment (or reverse engineering) approach, which provides "bottom-up" manufacturing cost assessments for achieving various levels of increased efficiency, based on detailed data as to costs for parts and material, labor, shipping/packaging, and investment for models that operate at particular efficiency levels.

1. Baseline Models

For each established product class, DOE selects a baseline model as a reference point against which any changes resulting from energy conservation standards can be measured. The baseline model in each product class represents the characteristics of common or typical products in that class. Typically, a baseline model is one that meets the current minimum energy conservation standards.

2. Baseline Efficiency Levels

DOE tentatively plans to consider the current minimum energy conservations standards (which went into effect June 1, 2014) to establish the baseline efficiency levels for each product class. Table II.5 presents the current energy conservation standards for room ACs. If DOE amends the room AC test procedure to provide an efficiency metric other than the current CEER, DOE will adjust the CEER baseline levels to account for the new metric.

Table II.5 Current Energy Conservation Standards for Room Air Conditioners

Product Class	CEER, Effective as of June 1, 2014
1. Without reverse cycle, with louvered sides, and less than 6,000 Btu/h	11.0
2. Without reverse cycle, with louvered sides, and 6,000 to 7,999 Btu/h	11.0
3. Without reverse cycle, with louvered sides, and 8,000 to 13,999 Btu/h	10.9
4. Without reverse cycle, with louvered sides, and 14,000 to 19,999 Btu/h	10.7
5A. Without reverse cycle, with louvered sides, and 20,000 to 27,999 Btu/h	9.4
5B. Without reverse cycle, with louvered sides, and 28,000 Btu/h or more	9.0
6. Without reverse cycle, without louvered sides, and less than 6,000 Btu/h	10.0
7. Without reverse cycle, without louvered sides, and 6,000 to 7,999 Btu/h	10.0
8A. Without reverse cycle, without louvered sides, and 8,000 to 10,999 Btu/h	9.6
8B. Without reverse cycle, without louvered sides, and 11,000 to 13,999 Btu/h	9.5
9. Without reverse cycle, without louvered sides, and 14,000 to 19,999 Btu/h	9.3

10. Without reverse cycle, without louvered sides, and 20,000 Btu/h or more	9.4
11. With reverse cycle, with louvered sides, and less than 20,000 Btu/h	9.8
12. With reverse cycle, without louvered sides, and less than 14,000 Btu/h	9.3
13. With reverse cycle, with louvered sides, and 20,000 Btu/h or more	9.3
14. With reverse cycle, without louvered sides, and 14,000 Btu/h or more	8.7
15. Casement-Only	9.5
16. Casement-Slider	10.4

Issue E.1 DOE requests comment on approaches that it should consider when determining the baseline efficiency levels for each product class, including information regarding the merits and/or limitations of such approaches.

3. Higher Efficiency Levels

For each product class, DOE will define efficiency levels beyond the baseline and develop incremental manufacturing cost data for each efficiency level. To define the efficiency levels, DOE tentatively plans to evaluate potential efficiency improvements from available design options and consider voluntary certification program levels such as ENERGY STAR and Consortium for Energy Efficiency's (CEE) Super Efficient Home Appliance Initiative (SEHA). The current ENERGY STAR and CEE voluntary certification levels are presented in Table II.6.

Table II.6 Current ENERGY STAR and CEE SEHA Levels for Room Air Conditioners

Product Class	Oct. 2013 ENERGY STAR (CEER)	Oct. 2013 ENERGY STAR (EER)	SEHA Tier 1 (EER)*	SEHA Tier 2 (EER)*
1. Without reverse cycle, with louvered sides, and less than 6,000 Btu/h	11.0	11.2	11.2	11.6
2. Without reverse cycle, with louvered sides, and 6,000 to 7,999 Btu/h	11.0	11.2	11.2	11.6
3. Without reverse cycle, with louvered sides, and 8,000 to 13,999 Btu/h	11.2	11.3	11.3	11.8
4. Without reverse cycle, with louvered sides, and 14,000 to 19,999 Btu/h	11.1	11.2	11.2	11.6
5a. Without reverse cycle, with louvered sides, and 20,000 to 27,999 Btu/h	9.8	9.8	9.8†	10.2†
5b. Without reverse cycle, with louvered sides, and 28,000 Btu/h or more	9.8	9.8	9.8†	10.2†
6. Without reverse cycle, without louvered sides, and less than 6,000 Btu/h	10.2	10.4	-	-
7. Without reverse cycle, without louvered sides, and 6,000 to 7,999 Btu/h	10.2	10.4	-	-
8a. Without reverse cycle, without louvered sides, and 8,000 to 10,999 Btu/h	9.7	9.8	-	-
8b. Without reverse cycle, without louvered sides, and 11,000 to 13,999 Btu/h	9.7	9.8	-	-
9. Without reverse cycle, without louvered sides, and 14,000 to 19,999 Btu/h	9.7	9.8	-	-
10. Without reverse cycle, without louvered sides, and 20,000 Btu/h or more	9.7**	9.8**	-	-
11. With reverse cycle, with louvered sides, and less than 20,000 Btu/h	10.3	10.4	-	-
12. With reverse cycle, without louvered sides, and less than 14,000 Btu/h	9.7	9.8	-	-
13. With reverse cycle, with louvered sides, and 20,000 Btu/h or more	9.8	9.8	-	-
14. With reverse cycle, without louvered sides, and 14,000 Btu/h or more	9.1	9.2	-	-
15. Casement-Only	9.9	10	-	-
16. Casement-Slider	10.8	10.9	-	-

* Note that CEE SEHA does not specify tier levels in CEER, and tier levels are only specified for units in classes 1-5b.

** ENERGY STAR requires that units with cooling capacity greater or equal 28,000 Btu/h achieve 9.8 CEER. The aforementioned capacity range is part of product class 10 in the current rule.[10]

† The CEE SEHA room air conditioner specification defines two capacity ranges that cover the same range as product classes 5a and 5b: 20,000 Btu/h to 24,999 Btu/h or greater than 25,000 Btu/h. These do not match the capacity ranges defined by DOE: 20,000 Btu/h to 27,999 Btu/h or greater than 28,000 Btu/h.[11]

[10] ENERGY STAR guidelines are available at: www.energystar.gov/sites/default/files/specs/ENERGY%20STAR%20Version%203.1%20Room%20Air%20Conditioner%20Program%20Requirements.pdf

[11] CEE SEHA room air conditioner guidelines are available at: http://library.cee1.org/sites/default/files/library/9296/CEE_ResApp_RoomAirConditionerSpecification_2003_Updated_Again.pdf

Issue E.2 DOE seeks input concerning efficiency levels to analyze for room ACs. Specifically, DOE seeks information that may guide the definition of efficiency levels, including any additional voluntary certification programs or relevant foreign standards or programs.

Issue E.3 DOE seeks input on appropriate maximum technologically feasible efficiency levels and the basis for why those levels should be selected.

F. Markups Analysis

To carry out the life-cycle cost (LCC) and payback period (PBP) calculations, DOE needs to determine the cost to the residential consumer of baseline products that satisfies the currently applicable standards, and the cost of the more-efficient unit the consumer would purchase under potential amended standards. By applying a multiplier called a "markup" to the manufacturer's selling price, DOE is able to estimate the residential consumer's price.

For the April 2011 Direct Final Rule, DOE based the distribution channels on data from AHAM. For room ACs, the main actors are manufacturers and retailers. Thus, DOE analyzed a manufacturer-to-consumer distribution channel consisting of three parties: (1) the manufacturers producing the products; (2) the retailers purchasing the products from manufacturers and selling them to consumers; and (3) the consumers who purchase the products. DOE plans to use the same approach in the current rulemaking.

As was done in the last rulemaking and consistent with the approach followed for other

energy consuming products, DOE will determine an average manufacturer markup by examining the annual Securities and Exchange Commission (SEC) 10-K reports filed by publicly traded manufacturers of appliances whose product range includes room ACs. DOE will determine an average retailer markup by analyzing both economic census data from the U.S. Census Bureau and the annual SEC 10-K reports filed by publicly traded retailers.

In addition to developing manufacturer and retailer markups, DOE will develop and include sales taxes to calculate appliance retail prices. DOE will use an Internet source, the Sales Tax Clearinghouse, to calculate applicable sales taxes.

Issue F.1 DOE seeks input from stakeholders on whether the distribution channels described above are still relevant for room ACs. DOE also welcomes comments concerning its proposed approach to developing estimates of markups for room ACs.

Issue F.2 DOE seeks recent data to establish the markups for the parties involved with the distribution of the product addressed in this notice.

G. Energy Use Analysis

The purpose of the energy use analysis is to assess the energy savings potential of different product efficiencies. DOE uses the annual energy consumption and energy-savings potential in the LCC and PBP analyses to establish the savings in consumer operating costs at various product efficiency levels. In contrast to the DOE test procedure, which provides a measure of the energy use, energy efficiency or annual operating cost of a covered product

during a representative average use cycle, the energy use analysis seeks to capture the range of operating conditions for room ACs in U.S. homes.

To determine the field energy use of products that would meet possible standard levels, DOE proposes to use data from the Energy Information Administration's (EIA's) 2009 Residential Energy Consumption Survey (RECS), or the most recent such survey available from EIA.[12] RECS is a national sample survey of housing units that collects statistical information on the consumption of and expenditures for energy in housing units along with data on energy-related characteristics of the housing units and occupants.

For the April 2011 Direct Final Rule, DOE used the data reported by RECS on the annual energy consumption (field energy consumption) for room air conditioning. The reported end-use quantities were not based on metering of individual appliances; rather, EIA used a regression technique to estimate how much of the total annual electricity consumption for each household can be attributed to each end-use category. The reported field energy consumption refers to the consumption of all of the room ACs in a home. RECS also reports the number of room ACs in the home. To estimate the energy consumption of a single room AC for this rulemaking, DOE divided the room AC energy use reported in RECS by the reported number of room ACs. For houses with both central air conditioning and room air conditioning, DOE scaled the energy use by using a relative use factor. Although in reality the utilization of each of the room ACs in a home may vary, the RECS data does not allow DOE to estimate such variation.

In the April 2011 Direct Final Rule, DOE estimated that, based on stakeholder input, 12-

[12]For information on RECS, see http://www.eia.doe.gov/emeu/recs/.

percent of room AC shipments were utilized in commercial building applications. The Energy Information Administration's Commercial Buildings Energy Consumption Survey (CBECS)[13] does not report annual energy consumption for room air conditioning, so DOE estimated the energy consumption using variables specific to each building in the sample and data on cooling degree-days. For this rulemaking, DOE is considering using the same methodology to estimate energy use in commercial building applications.

DOE requests comment or seeks input from stakeholders on the following issues pertaining to the energy use analysis:

Issue G.1 DOE requests stakeholder input regarding the impact of changes in CEER on cooling energy savings.

Issue G.2 Data sources that DOE can use to characterize the variability in annual energy consumption of room ACs.

Issue G.3 DOE requests stakeholder comment on whether a significant enough percentage of residential room ACs are utilized in commercial buildings to warrant considering their use in commercial applications.

H. Life-Cycle Cost and Payback Period Analysis

The purpose of the LCC and PBP analysis is to analyze the effects of potential amended energy conservation standards on consumers of residential room AC products by determining

[13] For information on CBECS, see http://www.eia.gov/consumption/commercial/about.cfm.

how a potential amended standard affects the consumers' operating expenses (usually decreased) and total installed costs (usually increased).

DOE intends to analyze data input variability and uncertainty by performing the LCC and PBP calculations on a representative sample of households from RECS and commercial buildings from CBECS for the considered product classes using Monte Carlo simulation and probability distributions. The analysis results are a distribution of results showing the range of LCC savings and PBPs for a given efficiency level relative to the baseline level.

Inputs to the LCC and PBP analysis are categorized as: (1) inputs for establishing the purchase expense, otherwise known as the total installed cost, and (2) inputs for calculating the operating expense. The primary inputs for establishing the total installed cost are the baseline consumer price, standard-level consumer price increases, and installation costs. Baseline consumer prices and standard-level consumer price increases will be determined by applying markups to manufacturer price estimates. The installation cost is added to the consumer price to arrive at a total installed cost.

In the April 2011 Direct Final Rule, DOE derived the installation costs from room AC data in RS Means. 76 FR 22454 (Apr. 21, 2011). DOE plans to use similar data sources for this rulemaking, with adjustments to reflect current-day labor and material prices as well as to scale installation cost for higher-efficiency products based on equipment weight and/or dimensions.

Issue H.1 DOE seeks input on whether room AC installation costs will scale with

equipment weight and/or dimensions.

The primary inputs for calculating the operating costs are product energy consumption, product efficiency, electricity prices and forecasts, maintenance and repair costs, product lifetime, and discount rates.

Repair costs are associated with repairing or replacing components that have failed in the appliance, whereas maintenance costs are associated with maintaining the operation of the equipment. In the April 2011 Direct Final Rule, DOE assumed a maintenance increase for the higher-capacity units due to more expensive product cost but no maintenance differences with higher efficiency units. 76 FR 22454 (Apr. 21, 2011).

Issue H.2 DOE seeks stakeholder input on the appropriateness to assume that changes in maintenance costs will be negligible for more-efficient products.

Repair costs are costs associated with a major repair during the lifetime of the product. In the April 2011 Direct Final Rule, DOE determined the costs of major repairs (e.g., compressor replacement) from RS Means and industry literature. 76 FR 22454 (Apr. 21, 2011). DOE also assumed that repair costs vary in direct proportion with the product price at higher efficiency levels as replacement costs for more-efficient components are likely to be greater than components in baseline products. Id.

Issue H.3 DOE seeks stakeholder comment on the assumption that repair costs vary in

direct proportion to product price and unit capacity.

DOE measures LCC and PBP impacts of potential standard levels relative to a base case that reflects the market in the absence of amended standards. DOE plans to develop market-share efficiency data (i.e., the distribution of product shipments by efficiency) for the product classes DOE is considering, for the year in which compliance with any amended or new standards would be required. By accounting for consumers who already purchase more efficient products, DOE avoids overstating the potential benefits from potential standards.

Issue H.4 DOE seeks stakeholder input and data on the fraction of room ACs that are sold above the minimum energy efficiency standards. DOE also requests information on expected trends in product efficiency over the next 5 years.

I. Shipments Analysis

DOE uses shipment projections by product class and efficiency level in its analysis of the national impacts of potential standards, as well as in the manufacturer impact analysis.

In the April 2011 Direct Final Rule, DOE developed a shipments model for room ACs driven by historical shipments data, which were used to build up a product stock and calibrate the shipments model. 76 FR 22454 (Apr. 21, 2011). Shipments of each product class were projected for two market sectors that use these products: residential and commercial sectors.

Issue I.1 DOE seeks stakeholder input and data showing the distribution of shipments by

product class, and market sector.

In the April 2011 Direct Final Rule, DOE modeled the decision to repair or replace equipment for existing owners and the impact that decision would have on the shipments model. 76 FR 22454 (Apr. 21, 2011). DOE investigated how increases in product purchase price and decreases in product operating costs due to standards impact product shipments.

Issue I.2 DOE seeks input and data on factors that influence a consumer's decisions to repair or replace failed products. In particular, DOE is seeking historical repair cost data as a function of efficiency.

J. National Impact Analysis

The purpose of the national impact analysis (NIA) is to estimate aggregate impacts of potential efficiency standards at the national level. Impacts reported by DOE include the national energy savings (NES) from potential standards and the national net present value (NPV) of the total consumer benefits. The NIA considers lifetime impacts of potential standards on room ACs shipped in a 30-year period that begins with the expected compliance date for new or amended standards.

To develop the NES, DOE calculates annual energy consumption of products in residential and commercial building stock for the base case and each standards case. To develop the national NPV of consumer benefits from potential standards, DOE calculates national annual energy expenditures and annual product expenditures for the base case and the standards cases.

DOE calculates total annual energy expenditures using data on annual energy consumption in each case, forecasted average annual energy prices, and shipment projections. The difference each year between operating cost savings and increased product expenditures is the net savings or net costs.

A key component of DOE's estimates of NES and NPV is the product energy efficiency forecasted over time for the base case and for each of the standards cases. In the April 2011 Direct Final Rule, DOE based projections of base-case shipment-weighted efficiency (SWEF) for the room AC product classes on growth rates determined from historical data provided by AHAM. 76 FR 22454 (Apr. 21, 2011). For this rulemaking, DOE plans on considering recent trends in efficiency and input from stakeholders to update product energy efficiency forecasts.

Issue J.1 DOE seeks historical SWEF data for room ACs by product class and stakeholder input regarding future trends in efficiency.

K. Manufacturer Impact Analysis

The purpose of the manufacturer impact analysis (MIA) is to estimate the financial impact of potential energy conservation standards on manufacturers of room ACs and to evaluate the potential impact of such standards on employment and manufacturing capacity. The MIA includes both quantitative and qualitative aspects. The quantitative part of the MIA primarily relies on the Government Regulatory Impact Model (GRIM), an industry cash-flow model used to estimate a range of potential impacts on manufacturer profitability. The qualitative part of the MIA addresses a proposed standard's potential impacts on manufacturing capacity and industry

competition, as well as factors such as product characteristics, impacts on particular subgroups of firms, and important market and product trends.

As part of the MIA, DOE intends to analyze impacts of potential energy conservation standards on small business manufacturers of covered products. DOE intends to use the Small Business Administration's (SBA) small business size standards to determine whether manufacturers qualify as small businesses. The size standards are listed by North American Industry Classification System (NAICS) code and industry description.[14] Manufacturing of room ACs can be classified under either NAICS 333415, "Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing" or NAICS 335228, "Other Major Household Appliance Manufacturing." The SBA sets a threshold of 750 or 500 employees or less for an entity to be considered as a small business for these categories. These employee threshold would include all employees in a business's parent company and any other subsidiaries.

DOE used publically available information to attempt to identify any small business that manufactures room ACs. DOE cross-referenced the manufacturers listed in DOE's Compliance Certification Management System (CCMS) with individual company websites and market research tools (e.g., Hoovers reports). DOE's initial research indicates that no small businesses currently manufacture room ACs.

[14] Available online at: www.sba.gov/sites/default/files/Size_Standards_Table.pdf

Issue K.1 DOE requests comment on any small business manufacturers of room ACs that it should consider in its analysis.

III. Submission of Comments

DOE invites all interested parties to submit in writing by [INSERT DATE **45** DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER], comments and information on matters addressed in this notice and on other matters relevant to DOE's consideration of new or amended energy conservations standards for room ACs. After the close of the comment period, DOE will begin collecting data, conducting the analyses, and reviewing the public comments, as needed. These actions will be taken to aid in the development of a NOPR for room ACs if DOE decides to amend the standards for such products.

DOE considers public participation to be a very important part of the process for developing test procedures and energy conservation standards. DOE actively encourages the participation and interaction of the public during the comment period in each stage of the rulemaking process. Interactions with and between members of the public provide a balanced discussion of the issues and assist DOE in the rulemaking process. Anyone who wishes to be added to the DOE mailing list to receive future notices and information about this rulemaking or would like to request a public meeting should contact Ms. Brenda Edwards at (202) 586–2945, or via e-mail at Brenda.Edwards@ee.doe.gov.

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Kathleen B. Hogan
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Energy Efficiency and Renewable Energy

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