District 6—The State of Texas.

District 7—The States of Alaska, Arkansas, Arizona, Colorado, Hawaii, Idaho, Iowa, Kansas, Louisiana, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming.

Under this realignment: (1) The Florida counties of Citrus, Flagler, Hernando, Marion, Putnam, St. Johns and Sumter are moved from District 1 to District 2; (2) Alabama, Tennessee, and Virginia are moved from District 2 to District 4; (3) Arkansas, Louisiana, Mississippi, and Oklahoma are moved from District 2 to District 7; (4) Georgia counties Early, Baker, Miller, Mitchell, Colquitt, Thomas, Grady, Decatur, and Seminole are moved from District 2 to District 3, (5) South Carolina moved from District 3 to District 2; (6) Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota are moved from District 4 to District 7; (7) Alaska, Hawaii, Nevada, Oregon, and Washington are moved from District 5 to District 7; (8) The following counties in the State of Texas: Armstrong, Bailey, Briscoe, Carson, Castro, Childress, Cochran, Collingsworth, Cottle, Crosby, Dallam, Deaf Smith, Dickens, Donley, Floyd, Garza, Gray, Hale, Hall, Hanaford, Hartely, Hemphill, Hockely, Hutchinson, Kent, King, Lamb, Lipscomb, Lubbock, Lynn, Moore, Motley, Ochiltree, Oldham, Parmer, Potter, Randall, Roberts, Sherman, Stonewall, Swisher, Terry, Wheeler, and Yoakum are moved from District 7 to District 6; (9) the following counties in California: San Bernardino, Riverside, San Diego, and Imperial are moved from District 7 to District 5.

Due to the re-alignment of districts, the following vacancies are created: one producer vacancy in District 2; one handler vacancy in District 3, one producer vacancy in District 7; and two importer vacancies. Current Board members would be affected because their States or counties would be moved to other districts. Nomination meetings will be held as soon as possible in the new districts to fill the vacancies.

A 30-day comment period is provided to allow interested persons to respond to this proposal. Thirty days is deemed appropriate so that the proposed amendments, if adopted, may be implemented to allow for the calendar year 2012 nomination meetings to take place before the appointments for new Board members are due. All written comments received in response to this rule by the date specified would be considered prior to finalizing this action.

List of Subjects in 7 CFR Part 1210

Administrative practice and procedure, Advertising, Consumer information, Marketing agreements, Reporting and recordkeeping requirements, Watermelon promotion.

For the reasons set forth in the preamble, Part 1210, Chapter XI of Title 7 is proposed to be amended as follows:

PART 1210—WATERMELON RESEARCH AND PROMOTION PLAN

1. The authority citation for 7 CFR Part 1210 continues to read as follows:

Authority: 7 U.S.C. 4901–4916 and 7 U.S.C. 7401.

Subpart C—Rules and Regulations

2. Section 1210.501 is revised to read as follows:

§ 1210.501 Realignment of districts.

Pursuant to § 1210.320(c) of the Plan, the districts shall be as follows:

District 1—The Florida counties of Brevard, Broward, Charlotte, Collier, Dade, Desoto, Glades, Hardee, Hendry, Highlands, Hillsborough, Indian River, Lake, Lee, Manatee, Martin, Monroe, Okeechobee, Orange, Osceola, Palm Beach, Pasco, Pinellas, Polk, Sarasota, Seminole, St. Lucie, and Volusia.

District 2—The Florida counties of Alachua, Baker, Bay, Bradford, Calhoun, Citrus, Clay, Columbia, Dixie, Duval, Escambia, Flagler, Franklin, Gadsden, Gilchrist, Gulf, Hamilton, Hernando, Holmes, Jackson, Jefferson, Lafayette, Leon, Levy, Liberty, Madison, Marion, Nassau, Okaloosa, Putnam, Santa Rosa, St. Johns, Sumter, Suwannee, Taylor, Union, Wakulla, Walton, and Washington, and the States of North Carolina and South Carolina.

District 3—The State of Georgia.

District 4—The States of Alabama, Connecticut, Delaware, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Tennessee, Virginia, Vermont, Wisconsin, West Virginia, and Washington, DC.

District 5—The State of California.

District 6—The State of Texas.

District 7—The States of Alaska, Arkansas, Arizona, Colorado, Hawaii, Idaho, Iowa, Kansas, Louisiana, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming.

3. Section 1210.502 is added to read as follows:

§ 1210.502 Importer members.

Pursuant to § 1210.320(d) of the Plan, there are eight importer representatives on the Board based on the proportionate percentage of assessments paid by importers to the Board.

Dated: April 28, 2011.

David R. Shipman,

Associate Administrator, Agricultural Marketing Service.

[FR Doc. 2011–11043 Filed 5–4–11; 8:45 am]

BILLING CODE 3410–02–P

DEPARTMENT OF ENERGY

10 CFR Part 431

[Docket No. EERE–2011–BT–STD–0029]

RIN 1904–AC47

Energy Conservation Program for Certain Industrial Equipment: Energy Conservation Standards for Commercial Heating, Air-Conditioning, and Water-Heating Equipment

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

ACTION: Notice of data availability and request for public comment.

SUMMARY: The Energy Policy and Conservation Act of 1975 (EPCA), as amended, directs the U.S. Department of Energy (DOE) to establish energy conservation standards for certain commercial and industrial equipment, including commercial heating, air-conditioning, and water-heating products. Of particular relevance here, the statute also requires that each time the corresponding consensus standard—the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)/Illuminating Engineering Society of North America (IESNA) Standard 90.1—is amended by the industry, DOE must assess whether there is a need to update the uniform national energy conservation standards for the same equipment covered under EPCA. ASHRAE officially released an amended version of this industry standard (ASHRAE 90.1–2010) on October 29, 2010, thereby triggering DOE's related obligations under EPCA. In addition, the Energy Independence and Security Act of 2007 (EISA 2007) amended EPCA to require DOE to review the most recently published ASHRAE/IES Standard 90.1 with respect to single-package vertical air conditioners and single-package vertical heat pumps in accordance with the procedures established for reviewing the energy conservation standards for other

ASHRAE products. As a first step in meeting these statutory requirements, today's notice of data availability (NODA) discusses the results of DOE's analysis of the energy savings potential of amended energy conservation standards for certain types of commercial equipment covered by ASHRAE Standard 90.1, including single-package vertical air conditioners and single-package vertical heat pumps. The energy savings potentials are based upon either the efficiency levels specified in the amended industry standard (*i.e.*, ASHRAE Standard 90.1–2010) or more stringent levels that would result in significant additional conservation of energy and are technologically feasible and economically justified. DOE is publishing this NODA to: Announce the results and preliminary conclusions of DOE's analysis of potential energy savings associated with amended standards for this equipment, and request public comment on this analysis, as well as the submission of data and other relevant information.

DATES: DOE will accept comments, data, and information regarding this NODA submitted no later than June 6, 2011. See section IV, "Public Participation," of this notice for details.

ADDRESSES: Any comments submitted must identify the NODA for ASHRAE Products and provide the docket number EERE–2011–BT–STD–0029 and/or Regulatory Information Number (RIN) 1904–AC47. Comments may be submitted using any of the following methods:

1. *Federal eRulemaking Portal: http://www.regulations.gov*. Follow the instructions for submitting comments.
2. *E-mail: ASHRAE90.1-2011-STD-0029@ee.doe.gov*. Include the Docket Number EERE–2011–BT–STD–0029 and/or RIN number 1904–AC47 in the subject line of the message.
3. *Postal Mail:* Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, Mailstop EE–2J, 1000 Independence Avenue, SW., Washington, DC 20585–0121. If possible, please submit all items on a compact disc (CD), in which case it is not necessary to include printed copies.
4. *Hand Delivery/Courier:* Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, 950 L'Enfant Plaza, SW., Suite 600, Washington, DC 20024. Telephone: (202) 586–2945. If possible, please submit all items on a CD, in which case it is not necessary to include printed copies.

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

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 web page can be found at: *www.regulations.gov*. The *www.regulations.gov* web page contains a link to the docket for this notice, along with simple instructions on how to access all documents, including public comments, in the docket. See section IV.A for further information on how to submit comments through *www.regulations.gov*.

For further information on how to submit a comment or review other public comments and the docket, contact Ms. Brenda Edwards at (202) 586–2945 or by email: *Brenda.Edwards@ee.doe.gov*.

FOR FURTHER INFORMATION CONTACT: Mr. Mohammed Khan, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, Mailstop EE–2J, 1000 Independence Avenue, SW., Washington, DC 20585–0121. Telephone: (202) 586–7892. E-mail: *Mohammed.Khan@ee.doe.gov*.

Mr. Eric Stas, U.S. Department of Energy, Office of the General Counsel, Mailstop GC–71, 1000 Independence Avenue, SW., Washington, DC 20585–0121. Telephone: (202) 586–9507. E-mail: *Eric.Stas@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–2J, 1000 Independence Avenue, SW., Washington, DC 20585–0121. Telephone: (202) 586–2945. E-mail: *Brenda.Edwards@ee.doe.gov*.

SUPPLEMENTARY INFORMATION:

Table of Contents

I. Introduction

A. Authority

Title III, Part C [1] of the Energy Policy and Conservation Act of 1975 (EPCA or the Act), Public Law 94–163 (42 U.S.C. 6311–6317, as codified), added by Public Law 95–619, Title IV, § 441(a), established the Energy Conservation Program for Certain Industrial Equipment, which includes the commercial heating, air-conditioning, and water-heating equipment that is the subject of this rulemaking.[2] In general, this program addresses the energy efficiency of certain types of commercial and industrial equipment. Relevant provisions of the Act specifically include definitions (42 U.S.C. 6311), test procedures (42 U.S.C. 6314), labelling provisions (42 U.S.C. 6315), energy conservation standards (42 U.S.C. 6313), and the authority to require information

[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 Independence and Security Act of 2007, Public Law 110–140.

and reports from manufacturers (42 U.S.C. 6316).

In relevant part here, EPCA contains mandatory energy conservation standards for commercial heating, air-conditioning, and water-heating equipment. (42 U.S.C. 6313(a)) Specifically, the statute sets standards for small, large, and very large commercial package air-conditioning and heating equipment, packaged terminal air conditioners (PTACs) and packaged terminal heat pumps (PTHPs), warm-air furnaces, packaged boilers, storage water heaters, instantaneous water heaters, and unfired hot water storage tanks. *Id.* In doing so, EPCA established Federal energy conservation standards that generally correspond to the levels in ASHRAE Standard 90.1, *Energy Standard for Buildings Except Low-Rise Residential Buildings,* as in effect on October 24, 1992 (*i.e.,* ASHRAE Standard 90.1–1989), for each type of covered equipment listed in 42 U.S.C. 6313(a). EISA 2007 further amended EPCA by adding definitions and setting minimum standards for single-package vertical air conditioners (SPVACs) and single-package vertical heat pumps (SPVHPs). (42 U.S.C. 6313(a)(10)(A)) The standards for SPVACs and SPVHPs established by EISA 2007 corresponded to the levels contained in ASHRAE Standard 90.1–2004, which originated as addendum "d" to Standard 90.1–2001.

In acknowledgement of technological changes that yield energy efficiency benefits, Congress directed DOE through EPCA to consider amending the existing Federal energy efficiency standard for each type of equipment listed, 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,[3] DOE must adopt amended 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 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 decides to adopt as a national standard the minimum 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)) However, if DOE determines that a more stringent standard is justified under 42 U.S.C. 6313(a)(6)(A)(ii)(II), then DOE must establish such more stringent standard not later than 30 months after publication of the amended ASHRAE Standard 90.1. (42 U.S.C. 6313(a)(6)(B))

Additionally, EISA 2007 amended EPCA to require that DOE review the most recently published ASHRAE/IES Standard 90.1 with respect to single-package vertical air conditioners and single-package vertical heat pumps in accordance with the procedures established for ASHRAE products under paragraph 42 U.S.C. 6313(a)(6). (42 U.S.C. 6313(a)(10)(B)) However, DOE believes that this requirement is separate and independent from the requirement described in the paragraph above for all ASHRAE products and that it requires DOE to evaluate potential standards higher than the ASHRAE Standard 90.1–2010 level for single-package vertical air conditioners and heat pumps, even if the efficiency levels for SPVACs and SPVHPs have not changed since the last version of ASHRAE Standard 90.1.

As a preliminary step in the process of reviewing the changes to ASHRAE Standard 90.1, EPCA directs DOE to publish in the **Federal Register** for public comment an analysis of the energy savings potential of amended energy efficiency standards, within 180 days after ASHRAE Standard 90.1 is amended with respect to any of the covered products specified under 42 U.S.C. 6313(a). (42 U.S.C. 6313(a)(6)(A))

On October 29, 2010, ASHRAE officially released for distribution and made public ASHRAE Standard 90.1–2010.[4] This action by ASHRAE triggered DOE's obligations under 42 U.S.C. 6313(a)(6), as outlined above. This NODA embodies the analysis of the energy savings potential of amended energy efficiency standards, as required under 42 U.S.C. 6313(a)(6)(A)(i). This NODA also addresses DOE's obligations under 42 U.S.C. 6313(a)(10)(B) to consider the most recently published ASHRAE/IES Standard 90.1 with respect to single-package vertical air conditioners and single-package vertical heat pumps in accordance with the procedures established for ASHRAE products under paragraph 42 U.S.C. 6313(a)(6).

B. Purpose of the Notice of Data Availability

As explained above, DOE is publishing today's NODA as a preliminary step pursuant to EPCA's requirements for DOE to consider amended energy conservation standards for certain types of commercial equipment covered by ASHRAE Standard 90.1, whenever ASHRAE amends its standard to increase the energy efficiency level for that equipment type. This NODA also addresses the requirements to consider amended energy conservation standards for SPVACs and SPVHPs under 42 U.S.C. 6313(a)(10)(B). Specifically, this NODA presents for public comment DOE's analysis of the potential energy savings estimates for amended national energy conservation standards for these types of commercial equipment based on: (1) The amended efficiency levels contained within ASHRAE Standard 90.1–2010,[5] and (2) more stringent efficiency levels. DOE describes these analyses and preliminary conclusions and seeks input from interested parties, including the submission of data and other relevant information.

DOE is not required by EPCA to review additional changes in ASHRAE Standard 90.1–2010 for those equipment types where ASHRAE did not increase the efficiency level. For those types of equipment for which efficiency levels clearly did not change, DOE has conducted no further analysis (with the exception of SPVACs and SPVHPs, for which EPCA requires DOE to review standard levels regardless of whether there was a change to ASHRAE Standard 90.1). However, for certain

[3] Although EPCA does not explicitly define the term "amended" in the context of ASHRAE Standard 90.1, DOE provided its interpretation of what would constitute an "amended standard" in a final rule published in the **Federal Register** on March 7, 2007 (hereafter referred to as the "March 2007 final rule"). 72 FR 10038. In that rule, DOE stated that the statutory trigger requiring DOE to adopt uniform national standards based on ASHRAE action is for ASHRAE to change a standard for any of the equipment listed in EPCA section 342(a)(6)(A)(i) (42 U.S.C. 6313(a)(6)(A)(i)) by increasing the energy efficiency level for that equipment type. *Id.* at 10042. In other words, if the revised ASHRAE Standard 90.1 leaves the standard level unchanged or lowers the standard, as compared to the level specified by the national standard adopted pursuant to EPCA, DOE does not have the authority to conduct a rulemaking to consider a higher standard for that equipment pursuant to 42 U.S.C. 6313(a)(6)(A). DOE subsequently reiterated this position in a final rule published in the **Federal Register** on July 22, 2009. 74 FR 36312, 36313.

[4] This industry standard is developed with input from a number of organizations—most prominently ASHRAE, the American National Standards Institute (ANSI), and the Illuminating Engineering Society of North America (IESNA). Therefore, this document may sometime be referred to more formally as ANSI/ASHRAE/IESNA Standard 90.1–2010. *See http://www.ashrae.org* for more information.

[5] For SPVACs and SPVHPs, ASHRAE Standard 90.1–2010 did not change the efficiency levels from the Federal standards, so DOE did not review ASHRAE Standard 90.1 levels for those equipment classes for that purpose, and only estimated potential energy savings for more stringent efficiency levels.

equipment classes of ASHRAE covered equipment, DOE found that while ASHRAE had made changes in ASHRAE Standard 90.1–2010, it was not immediately clear that the revisions to Standard 90.1 would increase the efficiency requirement in that Standard as compared to the existing Federal energy conservation standards. For example, for commercial warm-air furnaces, ASHRAE Standard 90.1–2010 changes the efficiency metric to thermal efficiency from combustion efficiency, which was the metric used in the previous version of ASHRAE Standard 90.1 (*i.e.,* ASHRAE Standard 90.1–2007). However, as discussed in section II.A of this NODA, the change does not result in an increase to the required efficiency, so DOE did not perform additional analysis for that equipment. Therefore, DOE carefully examined the changes for such products in ASHRAE Standard 90.1 in order to thoroughly evaluate the amendments in ASHRAE 90.1–2010, thereby permitting DOE to determine what action, if any, is required under its statutory mandate.

Section II of this notice contains a discussion of DOE's evaluation of each ASHRAE equipment type for which energy conservation standards have been set pursuant to EPCA ("covered equipment"), in order for DOE to determine whether the amendments in ASHRAE Standard 90.1–2010 have resulted in increased efficiency levels. For covered equipment types determined to have increased efficiency levels in ASHRAE Standard 90.1–2010, DOE subjected that equipment to further analysis as discussed in section III of this NODA.

In summary, the energy savings analysis presented in this NODA is a preliminary step required under 42 U.S.C. 6313(a)(6)(A)(i) and 6313(a)(10)(B). After review of the public comments on this NODA, if DOE determines that the amended efficiency levels in ASHRAE Standard 90.1–2010 have the potential for additional energy savings for types of equipment currently covered by uniform national standards, DOE will commence a rulemaking to consider amended standards, based upon either the efficiency levels in ASHRAE Standard 90.1–2010 or more-stringent efficiency levels which would be expected to result in significant additional conservation of energy and are technologically feasible and economically justified. In conducting such rulemaking, DOE will address the general rulemaking requirements for all energy conservation standards, such as the anti-backsliding provision [6] (42 U.S.C. 6316(a); 42 U.S.C. 6295(o)(1)), the criteria for making a determination that a standard is economically justified [7] (42 U.S.C. 6316(a); 42 U.S.C. 6295(o)(2)(B)(i)–(ii)), and the prohibition on making unavailable existing products with performance characteristics generally available in the U.S.[8] (42 U.S.C. 6316(a); 42 U.S.C. 6295(o)(4)).

[6] EPCA contains what is commonly known as an "anti-backsliding" provision. (42 U.S.C. 6316(a); 42 U.S.C. 6295(o)(1)) This provision mandates that the Secretary not prescribe any amended standard that either increases the maximum allowable energy use or decreases the minimum required energy efficiency of covered equipment.

[7] In deciding whether a more stringent standard is economically justified, DOE must review comments on the proposed standard, and then determine whether the benefits of the standard exceed its burdens by considering the following seven factors to the greatest extent practicable:

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

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

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

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

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

(6) The need for national energy conservation; and

(7) Other factors the Secretary considers relevant. (42 U.S.C. 6316(a); 42 U.S.C. 6295(o)(2)(B)(i)–(ii)).

[8] The Secretary may not prescribe an amended standard if interested persons have established by a preponderance of evidence that the amended standard would likely result in unavailability in the U.S. of any covered product type or class of performance characteristics, such as reliability, features, capacities, sizes, and volumes that are substantially similar to those generally available in the U.S. at the time of the Secretary's finding. (42 U.S.C. 6316(a); 42 U.S.C. 6295(o)(4)).

C. Background

1. ASHRAE Standard 90.1–2010

As noted above, ASHRAE released a new version of ASHRAE Standard 90.1 on October 29, 2010. The ASHRAE standard addresses efficiency levels for many types of commercial heating, ventilating, air-conditioning (HVAC), and water-heating equipment covered by EPCA. ASHRAE Standard 90.1–2010 revised the efficiency levels for certain commercial equipment, but for the remaining equipment, ASHRAE left in place the preexisting levels (*i.e.* the efficiency levels specified in EPCA or the efficiency levels in ASHRAE Standard 90.1–2007).

Table I.1 below shows the equipment classes (and corresponding efficiency levels) where ASHRAE Standard 90.1–2010 efficiency levels differed from the previous version of ASHRAE Standard 90.1 (*i.e.,* ASHRAE Standard 90.1–2007), as well as the requirements for SPVAC and SPVHP equipment (which were unchanged in ASHRAE Standard 90.1–2010 but which nonetheless must be addressed in this rulemaking for the reasons discussed above). Table I.1 also displays the existing Federal energy conservation standards and the corresponding standard levels in the latest version of ASHRAE Standard 90.1 for those equipment classes. Section II of this document assesses each of these equipment types to determine whether the amendments in ASHRAE Standard 90.1–2010 constitute increased energy efficiency levels, as would necessitate further analysis of the potential energy savings from amended Federal energy conservation standards, the conclusions of which are presented in the final column of Table I.1.

TABLE I.1—FEDERAL ENERGY CONSERVATION STANDARDS AND ENERGY EFFICIENCY LEVELS IN ASHRAE STANDARD 90.1–2010 FOR SPECIFIC TYPES OF COMMERCIAL EQUIPMENT *

ASHRAE equipment class **	Energy efficiency levels in ASHRAE standard 90.1–2007	Energy efficiency levels in ASHRAE standard 90.1–2010	Federal energy conservation standards	Energy-savings potential analysis required?
Commercial Warm-Air Furnaces				
Gas-Fired Commercial Warm-Air furnace.	E_c = 80% Interrupted or intermittent ignition device, jacket losses not exceeding 0.75% of input rating, power vent or flue damper ***.	E_t = 80% Interrupted or intermittent ignition device, jacket losses not exceeding 0.75% of input rating, power vent or flue damper ***.	E_t = 80%	No. See section II.A.
Commercial Package Air-Conditioning and Heating Equipment—Water-Cooled				
Water-cooled Air Conditioner, ≥65,000 and <135,000 Btu/h, Electric Resistance Heating or No Heating.	11.5 EER	12.1 EER (as of 6/1/11)	11.5 EER	Yes. See section II.B.1.
Water-cooled Air Conditioner, ≥65,000 and <135,000 Btu/h, All Other Heating.	11.3 EER	11.9 EER (as of 6/1/11)	11.3 EER	Yes. See section II.B.1.
Water-cooled Air Conditioner, ≥135,000 and <240,000 Btu/h, Electric Resistance Heating or No Heating.	11.0 EER	12.5 EER (as of 6/1/11)	11.0 EER	Yes. See section II.B.1.
Water-cooled Air Conditioner, ≥135,000 and <240,000 Btu/h, All Other Heating.	10.8 EER	12.3 EER (as of 6/1/11)	11.0 EER	Yes. See section II.B.1.
Water-cooled Air Conditioner, ≥240,000 Btu/h, Electric Resistance Heating or No Heating.	11.0 EER	12.4 EER (as of 6/1/11)	11.0 EER	Yes. See section II.B.1.
Water-cooled Air Conditioner, ≥240,000 Btu/h, All Other Heating.	10.8 EER	12.2 EER (as of 6/1/11)	10.8 EER	Yes. See section II.B.1.
Commercial Package Air-Conditioning and Heating Equipment—Evaporatively-Cooled				
Evaporatively-cooled Air Conditioner, ≥65,000 and <135,000 Btu/h, Electric Resistance Heating or No Heating.	11.5 EER	12.1 EER (as of 6/1/11)	11.5 EER	Yes. See section II.B.2.
Evaporatively-cooled Air Conditioner, ≥65,000 and <135,000 Btu/h, All Other Heating.	11.3 EER	11.9 EER (as of 6/1/11)	11.3 EER	Yes. See section II.B.2.
Evaporatively-cooled Air Conditioner, ≥135,000 and <240,000 Btu/h, Electric Resistance Heating or No Heating.	11.0 EER	12.0 EER (as of 6/1/11)	11.0 EER	Yes. See section II.B.2.
Evaporatively-cooled Air Conditioner, ≥135,000 and <240,000 Btu/h, All Other Heating.	10.8 EER	11.8 EER (as of 6/1/11)	11.0 EER	Yes. See section II.B.2.
Evaporatively-cooled Air Conditioner, ≥240,000 and <760,000 Btu/h, Electric Resistance Heating or No Heating.	11.0 EER	11.9 EER (as of 6/1/11)	11.0 EER	Yes. See section II.B.2.
Evaporatively-cooled Air Conditioner, ≥240,000 and <760,000 Btu/h, All Other Heating.	10.8 EER	11.7 EER† (as of 6/1/11)	10.8 EER	Yes. See section II.B.2.
Commercial Package Air-Conditioning and Heating Equipment—VRF Systems††				
VRF Air Conditioners, Air-cooled, <65,000 Btu/h.	N/A	13.0 SEER	13.0 SEER	No. See section II.B.3.
VRF Air Conditioners, Air-cooled, ≥65,000 and <135,000 Btu/h, Electric Resistance or No Heating.	N/A	11.2 EER	11.2 EER	No. See section II.B.3.
VRF Air Conditioners, Air-cooled, ≥135,000 and <240,000 Btu/h, Electric Resistance or No Heating.	N/A	11.0 EER	11.0 EER	No. See section II.B.3.

TABLE I.1—FEDERAL ENERGY CONSERVATION STANDARDS AND ENERGY EFFICIENCY LEVELS IN ASHRAE STANDARD 90.1–2010 FOR SPECIFIC TYPES OF COMMERCIAL EQUIPMENT *—Continued

ASHRAE equipment class **	Energy efficiency levels in ASHRAE standard 90.1–2007	Energy efficiency levels in ASHRAE standard 90.1–2010	Federal energy conservation standards	Energy-savings potential analysis required?
VRF Air Conditioners, Air-cooled, ≥240,000 Btu/h, Electric Resistance or No Heating.	N/A	10.0 EER	10.0 EER	No. See section II.B.3.
VRF Heat Pumps, Air-cooled, <65,000 Btu/h.	N/A	13.0 SEER, 7.7 HSPF	13.0 SEER, 7.7 HSPF	No. See section II.B.3.
VRF Heat Pumps, Air-cooled, ≥65,000 and <135,000 Btu/h, without heat recovery, Electric Resistance or No Heating.	N/A	11.0 EER, 3.3 COP	11.0 EER, 3.3 COP	No. See section II.B.3.
VRF Heat Pumps, Air-cooled, ≥65,000 and <135,000 Btu/h, with heat recovery, Electric Resistance or No Heating.	N/A	10.8 EER, 3.2 COP	11.0 EER (electric resistance heating), 10.8 EER (no electric resistance heating)††† 3.3 COP.	No. See section II.B.3.
VRF Heat Pumps, Air-cooled, ≥135,000 and <240,000 Btu/h, without heat recovery, Electric Resistance or No Heating.	N/A	10.6 EER, 3.2 COP	10.6 EER, 3.2 COP	No. See section II.B.3.
VRF Heat Pumps, Air-cooled, ≥135,000 and <240,000 Btu/h, with heat recovery, Electric Resistance or No Heating.	N/A	10.4 EER, 3.2 COP	10.6 EER (electric resistance heating), 10.4 (no electric resistance heating)††† 3.2 COP.	No. See section II.B.3.
VRF Heat Pumps, Air-cooled, ≥240,000 Btu/h, without heat recovery, Electric Resistance or No Heating.	N/A	9.5 EER, 3.2 COP	9.5 EER, 3.2 COP	No. See section II.B.3.
VRF Heat Pumps, Air-cooled, ≥240,000 Btu/h, with heat recovery, Electric Resistance or No Heating.	N/A	9.3 EER, 3.2 COP	9.5 EER (electric resistance heating), 9.3 EER (no electric resistance heating)††† 3.2 COP.	No. See section II.B.3.
VRF Heat Pumps, Water-source, <65,000 Btu/h, without heat recovery.	N/A	12.0 EER, 4.2 COP	11.2 EER (<17,000 Btu/h)††, 12.0 EER (≥17,000 Btu/h and <65,000 Btu/h) 4.2 COP.	Yes◊◊◊ for <17,000 Btu. No for ≥17,000 Btu/h and <65,000 Btu/h. See section II.B.3.
VRF Heat Pumps, Water-source, <65,000 Btu/h, with heat recovery.	N/A	11.8 EER, 4.2 COP	11.2 EER (< 17,000 Btu/h)†† 12.0 EER (≥ 17,000 Btu/h and <65,000 Btu/h), 4.2 COP.	Yes◊◊◊ for <17,000 Btu, No for ≥17,000 Btu/h and <65,000 Btu/h, See section II.B.3,
VRF Heat Pumps, Water-source, ≥65,000 and <135,000 Btu/h, without heat recovery.	N/A	12.0 EER, 4.2 COP	12.0 EER, 4.2 COP	No. See section II.B.3.
VRF Heat Pumps, Water-source, ≥65,000 and <135,000 Btu/h, with heat recovery.	N/A	11.8 EER, 4.2 COP	12.0 EER, 4.2 COP	No. See section II.B.3.
VRF Heat Pumps, Water-source, ≥135,000 Btu/h, without heat recovery.	N/A	10.0 EER, 3.9 COP	N/A	Yes◊◊◊. See section II.B.3.
VRF Heat Pumps, Water-source, ≥135,000 Btu/h, with heat recovery.	N/A	9.8 EER, 3.9 COP	N/A	Yes◊◊◊. See section II.B.3.
Commercial Package Air-Conditioning and Heating Equipment—PTACs and PTHPs‡‡				
Package Terminal Air Conditioner, <7,000 Btu/h, Standard Size (New Construction)‡‡.	EER = 11.0	EER = 11.7 (as of 10/8/12).	EER = 11.7	No. See section II.B.4.
Package Terminal Air Conditioner, ≥7,000 and <15,000 Btu/h, Standard Size (New Construction)‡‡‡.	EER = 12.5—(0.213 × Cap◊).	EER = 13.8—(0.300 × Cap◊) (as of 10/8/12).	EER = 13.8—(0.300 × Cap◊).	No. See section II.B.4.
Package Terminal Air Conditioner, >15,000 Btu/h, Standard Size (New Construction)‡‡‡.	EER = 9.3	EER = 9.3	EER = 9.3	No. See section II.B.4.
Package Terminal Heat Pump, <7,000 Btu/h, Standard Size (New Construction)‡‡‡.	EER = 10.8, COP = 3.0	EER = 11.9, COP = 3.3 (as of 10/8/12).	EER = 11.9, COP = 3.3	No. See section II.B.4.

TABLE I.1—FEDERAL ENERGY CONSERVATION STANDARDS AND ENERGY EFFICIENCY LEVELS IN ASHRAE STANDARD 90.1–2010 FOR SPECIFIC TYPES OF COMMERCIAL EQUIPMENT *—Continued

ASHRAE equipment class **	Energy efficiency levels in ASHRAE standard 90.1–2007	Energy efficiency levels in ASHRAE standard 90.1–2010	Federal energy conservation standards	Energy-savings potential analysis required?
Package Terminal Heat Pump, ≥7,000 and <15,000 Btu/h, Standard Size (New Construction)‡‡‡.	EER = 12.3—(0.213 × Cap◊), COP = 3.2—(0.026 × Cap◊).	EER = 14.0—(0.300 × Cap◊), COP = 3.7—(0.052 × Cap◊) (as of 10/8/12).	EER = 14.0—(0.300 × Cap◊), COP = 3.7—(0.052 × Cap◊).	No. See section II.B.4.
Package Terminal Heat Pump, >15,000 Btu/h, Standard Size (New Construction)‡‡‡.	EER = 9.1, COP = 2.8 ...	EER = 9.5, COP = 2.9 ...	EER = 9.5, COP = 2.9 ...	No. See section II.B.4.
Commercial Package Air-Conditioning and Heating Equipment—SDHV and TTW				
Through-the-Wall, Air-cooled Heat Pumps, ≤30,000 Btu/h.	12.0 SEER, 7.4 HSPF	13.0 SEER, 7.4 HSPF	13.0 SEER, 7.7 HSPF	No. See section II.B.5.
Small-Duct, High-Velocity, Air-cooled Heat Pumps, <65,000 Btu/h.	10.0 SEER, 6.8 HSPF	N/A◊◊	13.0 SEER, 7.7 HSPF	No. See section II.B.5.
Commercial Package Air-Conditioning and Heating Equipment—SPVACs and SPVHPs				
Single-Packaged Vertical Air Conditioners, <65,000 Btu/h.	9.0 EER	9.0 EER	9.0 EER	Yes. See section II.B.6.
Single-Packaged Vertical Air Conditioners, ≥65,000 and <135,000 Btu/h.	8.9 EER	8.9 EER	8.9 EER	Yes. See section II.B.6.
Single-Packaged Vertical Air Conditioners, ≥65,000 and <240,000 Btu/h.	8.6 EER	8.6 EER	8.6 EER	Yes. See section II.B.6.
Single-Packaged Vertical Heat Pumps, <65,000 Btu/h.	9.0 EER, 3.0 COP	9.0 EER, 3.0 COP	9.0 EER, 3.0 COP	Yes. See section II.B.6.
Single-Packaged Vertical Heat Pumps, ≥65,000 and <135,000 Btu/h.	8.9 EER, 3.0 COP	8.9 EER, 3.0 COP	8.9 EER, 3.0 COP	Yes. See section II.B.6.
Single-Packaged Vertical Heat Pumps, ≥65,000 and <240,000 Btu/h.	8.6 EER, 2.9 COP	8.6 EER, 2.9 COP	8.6 EER, 2.9 COP	Yes. See section II.B.6.
Air Conditioners and Condensing Units Serving Computer Rooms				
Air conditioners, air-cooled, <65,000 Btu/h.	N/A	2.20 SCOP (downflow), 2.09 SCOP (upflow).	N/A	Yes◊◊◊. See section II.C.
Air conditioners, air-cooled, ≥65,000 and <240,000 Btu/h.	N/A	2.10 SCOP (downflow), 1.99 SCOP (upflow).	N/A	Yes◊◊◊. See section II.C.
Air conditioners, air-cooled, ≥240,000 Btu/h.	N/A	1.90 SCOP (downflow), 1.79 SCOP (upflow).	N/A	Yes◊◊◊. See section II.C.
Air conditioners, water-cooled, <65,000 Btu/h.	N/A	2.60 SCOP (downflow), 2.49 SCOP (upflow).	N/A	Yes◊◊◊. See section II.C
Air conditioners, water-cooled, ≥65,000 and <240,000 Btu/h.	N/A	2.50 SCOP (downflow), 2.39 SCOP (upflow).	N/A	Yes◊◊◊. See section II.C.
Air conditioners, water-cooled, ≥240,000 Btu/h.	N/A	2.40 SCOP (downflow), 2.29 SCOP (upflow).	N/A	Yes◊◊◊. See section II.C.
Air conditioners, water-cooled with fluid economizer, <65,000 Btu/h.	N/A	2.55 SCOP (downflow), 2.44 SCOP (upflow).	N/A	Yes◊◊◊. See section II.C.
Air conditioners, water-cooled with fluid economizer, ≥65,000 and <240,000 Btu/h.	N/A	2.45 SCOP (downflow), 2.34 SCOP (upflow).	N/A	Yes◊◊◊. See section II.C.
Air conditioners, water-cooled with fluid economizer, ≥240,000 Btu/h.	N/A	2.35 SCOP (downflow), 2.24 SCOP (upflow).	N/A	Yes◊◊◊. See section II.C.
Air conditioners, glycol-cooled, <65,000 Btu/h.	N/A	2.50 SCOP (downflow), 2.39 SCOP (upflow).	N/A	Yes◊◊◊. See section II.C.
Air conditioners, glycol-cooled, ≥65,000 and <240,000 Btu/h.	N/A	2.15 SCOP (downflow), 2.04 SCOP (upflow).	N/A	Yes◊◊◊. See section II.C.
Air conditioners, glycol-cooled, ≥240,000 Btu/h.	N/A	2.10 SCOP (downflow), 1.99 SCOP (upflow).	N/A	Yes◊◊◊. See section II.C.
Air conditioners, glycol-cooled with fluid economizer, <65,000 Btu/h.	N/A	2.45 SCOP (downflow), 2.34 SCOP (upflow).	N/A	Yes◊◊◊. See section II.C.

TABLE I.1—FEDERAL ENERGY CONSERVATION STANDARDS AND ENERGY EFFICIENCY LEVELS IN ASHRAE STANDARD 90.1–2010 FOR SPECIFIC TYPES OF COMMERCIAL EQUIPMENT *—Continued

ASHRAE equipment class **	Energy efficiency levels in ASHRAE standard 90.1–2007	Energy efficiency levels in ASHRAE standard 90.1–2010	Federal energy conservation standards	Energy-savings potential analysis required?
Air conditioners, glycol-cooled with fluid economizer, ≥65,000 and <240,000 Btu/h.	N/A	2.10 SCOP (downflow), 1.99 SCOP (upflow).	N/A	Yes◊◊◊. See section II.C.
Air conditioners, glycol-cooled with fluid economizer, ≥240,000 Btu/h.	N/A	2.05 SCOP (downflow), 1.94 SCOP (upflow).	N/A	Yes◊◊◊. See section II.C.

* "E_c" means combustion efficiency; "E_t" means thermal efficiency; "EER" means energy efficiency ratio; "SEER" means seasonal energy efficiency ratio; "HSPF" means heating seasonal performance factor; "COP" means coefficient of performance; "Btu/h" means British thermal units per hour; and "SCOP" means sensible coefficient of performance.

** ASHRAE Standard 90.1–2010 equipment classes may differ from the equipment classes defined in DOE's regulations, but no loss of coverage will occur (*i.e.,* all previously covered DOE equipment classes remained covered equipment).

*** A vent damper is an acceptable alternative to a flue damper for those furnaces that draw combustion air from conditioned space.

† ASHRAE Standard 90.1–2010 specifies this efficiency level as 12.2 EER. However, as explained in section II.B of this NODA, DOE believes this level was a mistake and that the correct level is 11.7 EER.

†† Variable Refrigerant Flow (VRF) systems are newly defined equipment classes in ASHRAE Standard 90.1–2010. As discussed in section II.B.3 of this NODA, DOE believes these systems are currently covered by Federal standards for commercial package air conditioning and heating equipment.

††† For these equipment classes, ASHRAE sets lower efficiency requirements for equipment with heat recovery systems. DOE believes systems with heat recovery and electric resistance heating would be required to meet the current Federal standard for equipment with electric resistance heating (*i.e.,* the Federal standard level shown in the table). However, for equipment with heat recovery and no electric resistance heating, DOE believes heat recovery would be an "other" heating type allowing for a 0.2 EER reduction in the Federal minimum requirement.

‡ The Federal energy conservation standards for this equipment class are specified differently for equipment with cooling capacity <17,000 Btu/h. However, ASHRAE Standard 90.1–2010 does not distinguish this equipment class.

‡‡ For equipment rated according to the DOE test procedure, all EER values must be rated at 95 °F outdoor dry-bulb temperature for air-cooled products and evaporatively-cooled products, and at 85 °F entering water temperature for water-cooled products. All COP values must be rated at 47 °F outdoor dry-bulb temperature for air-cooled products, and at 70 °F entering water temperature for water-source heat pumps.

‡‡‡ "Standard size" refers to PTAC or PTHP equipment with wall sleeve dimensions ≥16 inches high, or ≥42 inches wide.

◊ "Cap" means cooling capacity in kBtu/h at 95°F outdoor dry-bulb temperature.

◊◊ ASHRAE Standard 90.1–2010 includes an efficiency level of 10.0 SEER for these products. However, as explained in section II.B.5 of this NODA, DOE believes that ASHRAE did not intend to set an efficiency level for these products.

◊◊◊ An energy-savings analysis for this class of equipment was not conducted due to either a lack of data or because there is no equipment on the market that would fall into this equipment class.

2. ASHRAE Standard 90.1 Proposed Addenda

Since officially releasing ASHRAE Standard 90.1–2010 on October 29, 2010, ASHRAE has released three proposed addenda relevant to today's NODA: Proposed Addendum h, Proposed Addendum i, and Proposed Addendum j. ASHRAE released all three addenda for first public review in March 2011, and the 45-day public review period ends May 9, 2011. Proposed Addendum h would remove the small-duct high-velocity (SDHV) product class from one of the tables of standards and correct the minimum efficiencies for through-the-wall products. In addition, it would amend the minimum energy efficiency standards (and change the product class names) for water-to-air heat pumps, including some product classes regulated by DOE (*e.g.,* "water-source" would become "water-to-air: Water loop"), with a proposed effective date immediately upon publication of the addendum.[9] Proposed Addendum i would amend the minimum energy efficiency standards for SPVACs and SPVHPs. It would also add a new product class designed to address SPVACs and SPVHPs in space-constrained applications. These would become effective January 1, 2012. Proposed Addendum j would remove SDHV from both tables of standards in which it was listed, and would also correct the EER for one product class of evaporatively-cooled units, as discussed in section II.B.5.

Because these proposed addenda have not yet been approved, DOE is not obligated to address these changes until the addenda are formally adopted and ASHRAE issues the next version of Standard 90.1 (expected in 2013). However, DOE acknowledges that these proposed addenda may affect the market which is addressed in today's NODA. As a result, DOE seeks comments on what impact, if any, these proposed addenda might have, if adopted, on the national energy savings analysis presented in today's NODA. This is Issue 1 under "Issues on Which DOE Seeks Comment" in section IV.B of this NODA.

D. Summary of DOE's Preliminary Assessment of Equipment for Energy-Savings Analysis

DOE has reached a preliminary conclusion for each of the classes of commercial equipment in ASHRAE Standard 90.1–2010 addressed in today's NODA. For each class of commercial equipment addressed in this NODA, section II presents DOE's initial determination as to whether ASHRAE increased the efficiency level for a given type of product, a change which would require an energy-savings potential analysis. Since DOE is not required by EPCA to review additional changes in ASHRAE Standard 90.1–2010 for those equipment types where ASHRAE did not increase the efficiency level, DOE has conducted no further analysis for those types of equipment where efficiency levels clearly did not change. Additionally, for equipment where ASHRAE Standard 90.1–2010 has increased the level in comparison to the previous version of ASHRAE Standard 90.1, but does not exceed the current Federal standard level, DOE does not have the authority to conduct a rulemaking to consider a higher standard for that equipment pursuant to 42 U.S.C. 6313(a)(6)(A) and did not perform an potential energy savings analysis. For those equipment classes where ASHRAE increased the efficiency level (in comparison to the Federal standard), DOE performed an analysis of the energy-savings potential,

[9] Ground water source (water to air: ground water) and ground source (brine to air: Ground loop) heat pumps are not covered products.

unless DOE found no products in the market in that equipment class (in which case there is no potential for energy savings) or there was a significant lack of data and information available that would allow DOE to reasonably estimate the potential for energy savings.

Based upon DOE's analysis discussed in section II, DOE has determined that ASHRAE increased the efficiency level for the following equipment classes:

• Small, Large, and Very Large Water-cooled Air Conditioners;
• Small, Large, and Very Large Evaporatively-cooled Air Conditioners;
• Certain Small (only those with cooling capacity < 17,000 Btu/h) and Large Variable Refrigerant Flow Water-Source Heat Pumps; and
• Air Conditioners and Condensing Units Serving Computer Rooms.

Out of those equipment classes, when DOE found that equipment is available on the market and adequate information exists to reasonably estimate potential energy savings, DOE performed the analysis of the energy-savings potential which is described in section III. However, when DOE did not find equipment available on the market (such as for small variable refrigerant flow water-source heat pumps with capacities below 17,000 Btu/h), or found that adequate efficiency and/or shipments data was unavailable (such as for air conditioners and condensing units serving computer rooms), DOE did not perform a potential energy savings analysis.

In addition, although ASHRAE did not increase the efficiency level for SPVACs and SPVHPs, DOE is required by EPCA to consider amending the energy conservation standards for these equipment classes using the procedures set forth by 42 U.S.C. 6313(a)(6) for ASHRAE products. Accordingly, DOE also performed an energy-savings analysis for SPVACs and SPVHPs and presents the results in section III.

II. Discussion of Changes in ASHRAE Standard 90.1–2010

Before beginning an analysis of the potential energy savings that would result from adopting the efficiency levels specified by ASHRAE Standard 90.1–2010 or more-stringent efficiency levels, DOE first determined whether or not the ASHRAE Standard 90.1–2010 efficiency levels actually represented an increase in efficiency above the current Federal standard levels, thereby triggering DOE action. This section contains a discussion of each equipment class where the ASHRAE Standard 90.1–2010 efficiency level differs from the current Federal standard level, along with DOE's preliminary conclusion regarding the appropriate action to take with respect to that equipment. In addition, this section contains a discussion of DOE's determination with regard to newly created equipment classes in ASHRAE Standard 90.1–2010 (*i.e.,* VRF commercial package air-conditioning and heating equipment and air conditioners serving computer rooms), and DOE's decisions with regard to the requirements for analyzing SPVACs and SPVHPs in EPCA. Finally, this section provides a brief discussion of the test procedure updates contained in ASHRAE Standard 90.1–2010.

A. Commercial Warm-Air Furnaces

Under 42 U.S.C. 6311(11)(A), a "warm air furnace" is defined as "a self-contained oil- or gas-fired furnace designed to supply heated air through ducts to spaces that require it and includes combination warm air furnace/electric air-conditioning units but does not include unit heaters and duct furnaces." In its regulations, DOE defines a "commercial warm air furnace" as a "warm air furnace that is industrial equipment, and that has a capacity (rated maximum input) of 225,000 Btu per hour or more." 10 CFR 431.72.

Gas-fired commercial warm-air furnaces are fueled by either natural gas or propane. The Federal minimum energy conservation standard for commercial gas-fired warm-air furnaces corresponds to the efficiency level in ASHRAE Standard 90.1–1989, which specifies for equipment with a capacity of 225,000 Btu/h or more, the thermal efficiency at the maximum rated capacity (rated maximum input) must be no less than 80 percent. 10 CFR 431.77(a). The Federal minimum energy conservation standard for gas-fired commercial warm-air furnaces applies to equipment manufactured on or after January 1, 1994. 10 CFR 431.77.

The current Federal standard for gas-fired commercial warm-air furnaces is in terms of "thermal efficiency," which is defined as "100 percent minus percent flue loss." 10 CFR 431.72. The previous version of ASHRAE Standard 90.1 (*i.e.,* ASHRAE 90.1–2007) specified a minimum efficiency level of 80 percent combustion efficiency, but it defined "combustion efficiency" as "100 percent minus flue losses" in the footnote to the efficiency table for commercial warm-air gas-fired furnaces, which references ANSI Z21.47–2001, "Standard for Gas-Fired Central Furnaces," as the test procedure. In its analysis for the 2009 notice of proposed rulemaking (NOPR) regarding standards for ASHRAE Products in which DOE considered the updates in ASHRAE Standard 90.1–2007, DOE noted that upon reviewing the efficiency levels and methodology specified in ASHRAE Standard 90.1–2007, it concluded that ASHRAE changed the efficiency metric for gas-fired commercial warm-air furnaces in name only, and not in the actual test or calculation method. 74 FR 12000, 12008–09 (March 20, 2009). Therefore, DOE stated its understanding that despite using the term "combustion efficiency" rather than "thermal efficiency," ASHRAE did not intend to change the substance of the metric. Consequently, DOE left the existing Federal energy conservation standards in place for gas-fired commercial warm-air furnaces, which specify a "thermal efficiency" of 80 percent using the definition of "thermal efficiency" presented at 10 CFR 431.72.

ASHRAE Standard 90.1–2010 updated the tabulated requirements for gas-fired commercial warm-air furnaces to specify a minimum efficiency level of 80 percent "thermal efficiency" and references ANSI Z21.47–2006, "*Standard for Gas-Fired Central Furnaces,*" as the test procedure. ANSI Z21.47–2006 defines "thermal efficiency" as "100 percent minus flue losses," which is the same as DOE's definition of "thermal efficiency" for this equipment. Because of this, DOE believes that the purpose of the ASHRAE metric change to "thermal efficiency" was to clarify the alignment to the existing Federal standards and the ANSI Z21.47–2006 test procedure. As a result, DOE tentatively concluded that this change does not constitute a revision to the actual efficiency level for gas-fired commercial warm-air furnaces and that no further action by the Department is required.

B. Commercial Package Air-Conditioning and Heating Equipment

EPCA, as amended, defines "commercial package air conditioning and heating equipment" as air-cooled, evaporatively-cooled, water-cooled, or water source (not including ground water source) electrically operated, unitary central air conditioners and central air conditioning heat pumps for commercial use. (42 U.S.C. 6311(8)(A); 10 CFR 431.92) EPCA also defines "small," "large," and "very large" commercial package air conditioning and heating equipment based on the equipment's rated cooling capacity. (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)

1. Water-Cooled Equipment

The current Federal energy conservation standards for the six classes of water-cooled commercial package air conditioners for which ASHRAE Standard 90.1–2010 amended efficiency levels are shown in Table I.1. The Federal energy conservation standards for water-cooled equipment are differentiated based on the cooling capacity (*i.e.,* small, large, or very large) and heating type (*i.e.,* electric resistance heating/no heating or some other type of heating). ASHRAE Standard 90.1–2010 increased the energy efficiency levels for all six equipment classes to efficiency levels that surpass the current Federal energy conservation standard levels. Therefore, the Department conducted an analysis of the potential energy savings due to amended standards for these products, which is described in section III of this NODA.

2. Evaporatively-Cooled Equipment

The current Federal energy conservation standards for the six classes of evaporatively-cooled commercial package air conditioners for which ASHRAE Standard 90.1–2010 amended efficiency levels are shown in Table I.1. Similar to water-cooled equipment, Federal energy conservation standards divide evaporatively-cooled equipment based on the cooling capacity (*i.e.,* small, large, or very large) and heating type (*i.e.,* electric resistance heating/no heating or some other type of heating). ASHRAE Standard 90.1–2010 increased the energy efficiency levels for all six equipment classes to efficiency levels that surpass the current Federal energy conservation standard levels.

DOE reviewed the market for evaporatively-cooled equipment and could not identify any models available on the market in the "small" unit product class (*i.e.,* cooling capacity < 135,000 Btu/h) and the "large" unit product class (*i.e.,* cooling capacity ≥ 135,000 and < 240,000 Btu/h). Because there is currently no equipment in these classes being manufactured, DOE believes there are no energy savings associated with these classes at this time; therefore, it is not possible to assess the potential for additional energy savings at the levels in ASHRAE Standard 90.1–2010 or more-stringent levels. Thus, DOE did not perform a potential energy-savings analysis for the small and large equipment classes of evaporatively-cooled commercial package air conditioners. DOE seeks comments from interested parties on its assessment of the market and energy savings potential for this equipment type. This is Issue 2 under "Issues on Which DOE Seeks Comment" in section IV.B of this NODA.

For very large (*i.e.,* cooling capacity ≥ 240,000 Btu/h) evaporatively-cooled air conditioners, DOE was able to identify a number of models on the market, and, therefore, DOE conducted an analysis of the potential energy savings for these products which is discussed in section III. For very large evaporatively-cooled air conditioners, ASHRAE Standard 90.1–2010 set the efficiency level for equipment with electric resistance or no heating at 11.9 EER and for equipment with all other heating at 12.2 EER. However, ASHRAE historically has set the levels for equipment with other heating at 0.2 EER points below the efficiency levels for equipment with electric heating or no heating, which would make the expected efficiency level for very large evaporatively-cooled equipment with other heating 11.7 EER. In February 2011, the Department received a letter from the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) indicating that the ASHRAE Standard 90.1–2010 efficiency level for very large evaporatively-cooled equipment with other heating is incorrect, and that the correct minimum energy efficiency standard for this category is 11.7 EER, as would be expected given the historical ASHRAE Standard 90.1 efficiency levels for these products. (AHRI, No. 0001 at p. 1) Further, AHRI indicated that at its winter 2011 meeting, the ASHRAE 90.1 committee approved an addendum for public review that corrects this error. In March 2011, ASHRAE released proposed Addendum j to ASHRAE Standard 90.1–2010, which corrects the value from 12.2 to 11.7 EER. Based on release of the public review draft of this addendum, the Department has tentatively decided to analyze the potential energy savings for this category at an ASHRAE Standard 90.1 level of 11.7 EER.

3. Variable Refrigerant Flow Equipment

ASHRAE 90.1–2010 created a separate product class for variable refrigerant flow (VRF) air-conditioning and heating equipment. These products are currently covered under DOE's standards for commercial air conditioners and heat pumps, but they are not broken out as a separate product class.

In general, a VRF system will have a single condensing unit serving multiple evaporator coils within a building. Specific "subclasses" of variable refrigerant flow heat pumps equipped with heat recovery capability have been specified in ASHRAE/IES Standard 90.1–2010 with lower efficiency requirements than specified for VRF systems without heat recovery. (Heat recovery capability provides for shuttling of heat from one part of the building to another and allows for simultaneous cooling and heating of different zones within a building.) Specifically, the efficiency requirements in ASHRAE Standard 90.1–2010 for air-cooled VRF heat pumps with heat recovery are equivalent to the Federal minimum energy conservation standards defined for air-cooled heat pumps with "all other heating system types that are integrated into the equipment," and the efficiency requirements for air-cooled VRF heat pumps without heat recovery are equivalent to the Federal minimum standards for air-cooled heat pumps with electric or no heating.[10] The VRF systems with heat recovery specified by ASHRAE may often have electric resistance heating systems, as a back-up. For air-cooled VRF heat pump systems that have both electric resistance heating and heat recovery heating capability, the Department has tentatively concluded that these systems must meet the efficiency requirements contained in EPCA for small, large, and very large air-cooled central air-conditioning heat pumps with electric resistance heating, which are codified at 10 CFR 431.97(b). (42 U.S.C. 6313(a)(7)–(9)) In addition, the Department has tentatively concluded that air-cooled VRF systems without electric resistance heating but with heat recovery can qualify as having an "other" means of heating and that these systems must meet the efficiency requirements contained in EPCA for small, large, and very large air-cooled central air-conditioning heat pumps with other heating, which are codified at 10 CFR 431.97(b). (42 U.S.C. 6313(a)(7)–(9))

Table II.1 shows the ASHRAE Standard 90.1–2010 efficiency levels for

[10] Section 136 of the Energy Policy Act of 2005 (EPACT 2005; Pub, L. 109–58) amended EPCA to include separate minimum efficiency requirements for commercial package air-cooled air conditioners and heating equipment with "all other heating system types that are integrated into the equipment" and with electric resistance or no heating.

VRF water-source heat pumps in comparison to the current Federal minimum energy conservation standards for water-source heat pumps, which DOE has preliminarily determined would apply to VRF systems. For water-source VRF heat pumps, ASHRAE Standard 90.1–2010 generally maintains the existing energy efficiency requirements that apply to commercial package air-conditioning and heating equipment for the VRF systems, with several notable exceptions. For VRF water-source heat pumps under 17,000 Btu/h and VRF water-source heat pumps over 135,000 Btu/h, ASHRAE Standard 90.1–2010 raises the efficiency levels above current Federal energy conservation standards (or in the case of water-source heat pumps over 135,000 Btu/h, ASHRAE sets standards for products where DOE did not previously have standards). As a result, the Department conducted further analysis for these classes. DOE began by reviewing the current market for VRF water-source heat pumps with cooling capacities below 17,000 Btu/h or above 135,000 Btu/h and less than 760,000 Btu/h. The Department did not identify any models under 17,000 Btu/h on the market. DOE did identify 19 models above 135,000 Btu/h on the market and attempted to contact the manufacturer producing most of these models, but DOE was unable to obtain EER information for most of the models and has no shipment information for this product class. Because DOE could not identify any VRF water-source heat pumps being manufactured with cooling capacities below 17,000 Btu/h, DOE believes that there are no energy savings associated with this equipment class. Therefore, DOE did not perform a potential energy-savings analysis for this equipment. In addition, due to the lack of available information and data on VRF water-source heat pumps with cooling capacities above 135,000 Btu/h at this time, the Department has not conducted a preliminary energy saving estimate for the additional energy savings beyond the levels anticipated in ASHRAE Standard 90.1–2010 for this VRF water source heat pump product class. DOE is requesting public comment regarding the market for this equipment and is seeking data and information that would allow it to accurately characterize the energy savings from amended energy conservation standards for these products. This is identified as Issue 3 in section IV.B "Issues on Which DOE Seeks Comment."

In addition to the changes for the two equipment classes discussed above, ASHRAE Standard 90.1–2010 includes efficiency levels for VRF water-source heat pumps that provide for a 0.2 EER reduction in the efficiency requirement for systems with heat recovery. However, the current Federal minimum standards for water-source heat pumps do not provide for any reduction in the EER requirements for equipment with "other" heating types. Therefore, the 0.2 EER reduction below the current Federal standard levels for the VRF water-source heat pump equipment classes in which ASHRAE did not raise the standard from the existing Federal minimum for water-source heat pumps (*i.e.,* water-source heat pumps with cooling capacities ≥ 17,000 and < 65,000 Btu/h and ≥ 65,000 and < 135,000 Btu/h) would result in a decrease in stringency in comparison to current standards. As noted in section I.A, if ASHRAE Standard 90.1 lowers its efficiency level as compared to the Federal minimum standard level, DOE does not have the authority to conduct a rulemaking to consider a higher standard for that equipment pursuant to 42 U.S.C. 6313(a)(6)(A). Therefore, DOE did not consider the lower EER requirements for systems with heat recovery and will not perform an analysis of those product classes.

TABLE II.1—COMPARISON OF FEDERAL ENERGY CONSERVATION STANDARDS FOR WATER-SOURCE HEAT PUMPS TO ASHRAE STANDARD 90.1–2010 REQUIREMENTS FOR VRF WATER-SOURCE HEAT PUMPS

Existing Federal equipment class	Federal minimum energy conservation standard	ASHRAE Standard 90.1–2010 efficiency level for newly established VRF equipment class
Water-source Heat Pump < 17,000 Btu/h	11.2 EER	12.0 EER (without heat recovery). 11.8 EER (with heat recovery).
	4.2 COP	4.2 COP.
Water-source Heat Pump ≥ 17,000 and < 65,000 Btu/h	12.0 EER	12.0 EER (without heat recovery). 11.8 EER (with heat recovery).
	4.2 COP	4.2 COP.
Water-source Heat Pump ≥ 65,000 and < 135,000 Btu/h	12.0 EER	12.0 EER (without heat recovery). 11.8 EER (with heat recovery).
	4.2 COP	4.2 COP.
Water-source Heat Pump ≥ 135,000 and < 760,000 Btu/h	N/A	10.0 EER (without heat recovery). 9.8 EER (with heat recovery). 3.9 COP.

4. Packaged Terminal Air Conditioners and Heat Pumps

EPCA defines a "packaged terminal air conditioner" as "a wall sleeve and a separate unencased combination of heating and cooling assemblies specified by the builder and intended for mounting through the wall. It includes a prime source of refrigeration, separable outdoor louvers, forced ventilation, and heating availability by builder's choice of hot water, steam, or electricity." (42 U.S.C. 6311(10)(A)) EPCA defines a "packaged terminal heat pump" as "a packaged terminal air conditioner that utilizes reverse cycle refrigeration as its prime heat source and should have supplementary heat source available to builders with the choice of hot water, steam, or electric resistant heat." (42 U.S.C. 6311(10)(B)) DOE codified these definitions in 10 CFR 431.92 in a final rule published in the **Federal Register** on October 21, 2004. 69 FR 61962, 61970.

DOE adopted amended energy conservation standards for this class of equipment in a final rule published in the **Federal Register** on October 7, 2008. 73 FR 58772, 58828–30. The adopted Federal standards exceeded the standards in ASHRAE Standard 90.1–2007. These Federal standards apply to standard size equipment manufactured on or after October 7, 2012, and non-standard size equipment manufactured on or after October 8, 2010. ASHRAE Standard 90.1–2010 increased the efficiency levels for standard size equipment in comparison to the efficiency levels in ASHRAE Standard 90.1–2007. However, the efficiency levels specified by ASHRAE Standard 90.1–2010 for these equipment classes meet and do not exceed the Federal standards established by DOE in the October 2008 final rule. Because ASHRAE seems to be harmonizing the levels in ASHRAE Standard 90.1–2010 with the Federal levels rather than increasing the minimum efficiency, DOE has tentatively concluded that it is not required to take action on these products at this time.

5. Small-Duct, High-Velocity, and Through-The-Wall Equipment

EPCA does not separate small-duct high-velocity (SDHV) or through-the-wall (TTW) heat pumps from other types of small commercial package air-conditioning and heating equipment in its definitions. (42 U.S.C. 6311(8)) Therefore, EPCA's definition of "small commercial package air conditioning and heating equipment" would include SDHV and TTW heat pumps.

ASHRAE Standard 90.1–2010 increased some of the efficiency levels for these classes of equipment. Specifically, ASHRAE Standard 90.1–2010 increased the efficiency requirements for TTW heat pumps to 13.0 SEER and 7.4 HSPF in comparison to the efficiency levels of 12.0 SEER and 7.4 HSPF in ASHRAE Standard 90.1–2007. However, in March 2011, ASHRAE issued Proposed Addendum h for public review that would correct the minimum SEER for these products to 12.0 SEER. For SDHV heat pumps, ASHRAE Standard 90.1–2010 did not increase the cooling efficiency requirement of 10.0 SEER beyond that in ASHRAE 90.1–2007. In addition, although ASHRAE 90.1–2007 specified a heating efficiency requirement of 6.8 HSPF, ASHRAE 90.1–2010 did not specify any heating efficiency level for SDHV heat pumps. However, Proposed Addenda h and j would remove the SDHV product class from the standards tables entirely, stating: "In addition the small duct high velocity requirements have been dropped by DOE and they are only allowing such systems under waiver clause so the addendum has also made a change to remove the small duct high velocity systems from table 6.8.1a and table 6.8.1b." Therefore, DOE believes that ASHRAE did not intend to specify any efficiency levels for these products in ASHRAE Standard 90.1–2010.

The DOE standards for both TTW and SDHV heat pumps, which are 13.0 SEER and 7.7 HSPF, were established for the overall equipment category of small commercial package air-conditioning and heating equipment by EISA 2007, which amended EPCA. (42 U.S.C. 6313(a)(7)(D)) Because the ASHRAE Standard 90.1–2010 efficiency levels for TTW equipment meet or do not exceed the DOE standards and because DOE believes that SDHV are no longer meant to be covered separately by ASHRAE Standard 90.1–2010, DOE has tentatively concluded that it is not required to take action on these products at this time.

6. Single-Package Vertical Air Conditioners and Single-Package Vertical Heat Pumps

DOE issued standards for single-package vertical air conditioner and heat pump units (SPVUs) as part of the March 23, 2009 final rule technical amendment in response to mandated efficiency levels for SPVUs established in the EISA 2007 legislation. 74 FR 12058. However, SPVUs are subject to a unique "look back" provision established by EISA 2007, which amended the applicable provisions of EPCA such that not later than three years after the date of this statutory provision's enactment (*i.e.,* December 19, 2007), the Secretary must review the most recently published ASHRAE/IES Standard 90.1 with respect to single-package vertical air conditioners and single-package vertical heat pumps using the procedures established under 42 U.S.C. 6313(a)(6). (42 U.S.C. 6313(a)(10)(B))

As noted in section I.A, the Department interprets the provision at 42 U.S.C. 6313(a)(10)(B) as constituting a separate trigger to evaluate standards higher than the ASHRAE Standard 90.1 level. SPVUs are considered classes within the broader scope of small and large commercial package air-conditioning and heating equipment; however, because of their special status (*i.e.,* that the efficiency levels for this equipment were statutorily prescribed by EISA 2007), Congress intended that DOE review them for potential energy savings and higher standards along the lines of the 18 month time frame review for other products (*i.e.,* do everything in part (6) with regard to analysis, but ignore the triggering requirement of ASHRAE Standard 90.1 changing its efficiency levels). EPCA, as amended, directs DOE to conduct a review of the energy savings potential sometime in the three-year interval, and DOE believes this separate trigger is a one-time mechanism, after which SPVUs revert to the normal "ASHRAE trigger." Accordingly, DOE has commenced analytical work on these products along with the other equipment which is subject to the current "ASHRAE trigger."

Upon review of the SPVU market, DOE identified several models of SPVUs in the small equipment class. However, DOE did not identify any models of SPVUs in the very large category or any models of SPVHPs in the large category. The Department identified only five models of SPVACs in the large category, and these were all close to the upper size limit of the small category, at 70,000 Btu/h or less. As a result of the apparent lack of a market for very large SPVUs and large SPVHPs, and a lack of shipment estimates for the large SPVACs, DOE conducted complete preliminary energy saving estimates for only the small equipment classes. Additionally, DOE used the energy saving results for small SPVACs to derive an estimate of the potential energy savings for large SPVACs. DOE requests comments regarding the market for SPVUs, specifically on the market for large and very large equipment. This is identified as Issue 4 in section IV.B "Issues on Which DOE Seeks Comment."

C. Air Conditioners and Condensing Units Serving Computer Rooms

Air conditioners and condensing units serving computer rooms operate similarly to other types of commercial packaged air conditioners in that they provide space conditioning using a refrigeration cycle consisting of a compressor, condenser, expansion valve, and evaporator. However, air conditioners and condensing units serving computer rooms are typically designed to maintain the temperature in the conditioned space at 72 degrees Fahrenheit, and maintain a specific relative humidity. This equipment is commonly capable of humidifying or dehumidifying the air and then, if necessary, reheating it to maintain a specific humidity.

ASHRAE Standard 90.1–2010 created a separate product class for "air conditioners and condensing units serving computer rooms," and set efficiency levels using the sensible coefficient of performance (SCOP) metric as measured using the test method in ASHRAE Standard 127–2007, "Method of Testing for Rating Computer and Data Processing Room Unitary Air Conditioners." The product classes and efficiency levels established in ASHRAE Standard 90.1–2010 are shown in Table I.1 above.

Prior to this equipment having separate efficiency levels and test procedures specified in ASHRAE Standard 90.1, DOE discussed such units using the terminology "computer room air conditioners" in an August 9, 2000 NOPR (65 FR 48828, 48830–31) and an October 21, 2004 direct final rule (69 FR 61962, 61967). In the August 2000 NOPR, DOE determined that computer room air conditioners were not covered as part of the commercial packaged air conditioning and heating equipment classes in EPCA and subsequently upheld this position in the October 2004 final rule. DOE made this determination because at the time of passage of the Energy Policy Act of 1992 (EPACT 1992, Pub. L. 102–486, which gave DOE the authority to cover commercial package air-conditioning and heating equipment), the statute excluded this equipment, and as a result, DOE concluded that it lacked the authority to regulate this equipment. The basis for DOE's decision stemmed from the scope of ASHRAE Standard 90.1, which at the time specified that the standard did not cover "equipment and portions of building systems that use energy primarily to provide for industrial, manufacturing, or commercial processes." (See section 2.3.c. of ASHRAE 90.1 standards prior to ASHRAE Standard 90.1–2010). Further, the House Report on EPACT 1992 (H.R. Rep. No. 474, 102d Cong., 2d Sess., pt. 1 at 175 (1992)) pointed out that the efficiency standards contained in the bill were developed by ASHRAE in ASHRAE Standard 90.1. DOE concluded that this indicated that the efficiency standards for commercial products in EPACT 1992 would have the same scope as the version of ASHRAE Standard 90.1 current at the time of the legislation's enactment, which did not cover computer room air conditioners. As a result, DOE concluded at the time that it did not have the authority to cover computer room air conditioners. However, DOE stated in both the NOPR and final rule that "if some of the relevant circumstances were to change—if, for example, ASHRAE Standard 90.1 were to incorporate efficiency standards and test procedures for this equipment or the equipment was to become widely used for conventional air conditioning applications—the Department might revisit this issue." 65 FR 48828, 48831 (August 9, 2000); 69 FR 61962, 61967 (Oct. 21, 2004).

ASHRAE Standard 90.1–2010 expanded the scope from previous versions of ASHRAE Standard 90.1 to include process loads (*e.g.,* computer rooms) and created a separate product class for "air conditioners and condensing units serving computer rooms." EPCA generally directs DOE to follow ASHRAE Standard 90.1 when it is amended with respect to certain equipment types, including commercial package air conditioning and heating equipment. Thus, DOE has tentatively concluded that because ASHRAE has expanded the scope of Standard 90.1 to include air conditioners and condensing units serving computer rooms, the scope of DOE's requirements with regard to ASHRAE products in EPCA is also expanded to encompass these products. As such, DOE has tentatively concluded it has the authority to review the ASHRAE Standard 90.1–2010 efficiency levels for air conditioners and condensing units serving computer rooms and to establish minimum energy conservation standard levels for this equipment. DOE seeks comment on how best to establish minimum energy conservation standards for air conditioners and condensing units serving computer rooms. This is identified as Issue 5 in section IV.B, "Issues on Which DOE Seeks Comment."

Although DOE has tentatively concluded that it has the authority to consider adopting minimum efficiency standards for air conditioners and condensing units serving computer rooms at or above the ASHRAE Standard 90.1–2010 efficiency levels, DOE did not perform a potential energy savings analysis for these products as a part of this NODA due to the lack of available data. The State of California requires manufacturers of computer room air conditioners to certify the EER of their computer room air conditioning equipment (20 CCR 1605.3(c)(2)),[11] and DOE examined the information in the California Energy Commission (CEC) appliance database[12] for computer room air conditioners. The CEC database contained over 300 models, indicating that there is a potentially significant market for computer room air conditioners. However, the database only contains efficiency information in the form of EER, and manufacturers currently do not report SCOP in the CEC database or in their literature. Because the efficiency levels in ASHRAE Standard 90.1–2010 are in SCOP, the EER efficiency information is of little use to DOE in analyzing the potential energy savings of the SCOP efficiency levels in ASHRAE Standard 90.1–2010. Since these equipment classes of air conditioners and condensing units serving computer rooms and the SCOP metric specified by ASHRAE Standard 90.1–2010 are newly-defined requirements, DOE was unable to obtain reliable efficiency data for the majority of models or shipments data that would allow DOE to characterize the energy savings potential of this equipment in a reasonably accurate manner. DOE is requesting data and information from interested parties regarding air conditioners and condensing units serving computer rooms that could be used in performing an energy savings analysis at a future stage of this rulemaking (*e.g.,* SCOP efficiency ratings, shipments information). This is identified as Issue 6 under section IV.B "Issues on Which DOE Seeks Comment."

Lastly, although DOE addressed computer room air conditioners in the August 2000 NOPR and October 2004 direct final rule, DOE never formally defined this equipment. In reviewing ASHRAE Standard 90.1–2010, DOE noted that ASHRAE does not define a class of equipment but rather an application (*i.e.,* "serving computer rooms"). Because air conditioners and condensing units serving computer have the same basic components as conventional air conditioners, there is some difficulty in defining air conditioners and condensing units serving computer rooms such that they can be clearly differentiated from conventional commercial packaged air conditioners and heat pumps. DOE reviewed the definitions in both ASHRAE 127–2007 (the test procedure specified in ASHRAE Standard 90.1–2010 for air conditioners and condensing units serving computer rooms) and Title 20 in the California Code of Regulations (which establishes California's requirements for this equipment), and found that the definitions in each do not contain criteria that would allow DOE to clearly differentiate these equipment from conventional equipment, without overlap between the types of equipment. DOE seeks comment on approaches for developing appropriate definitions for this equipment that would not result in overlap between "air conditioners and condensing units serving computer rooms" and the other types of commercial packaged air-conditioning and heating equipment covered by EPCA. This is identified as Issue 7 in section IV.B under "Issues for Which DOE Seeks Comment."

D. Test Procedures

EPCA requires the Secretary to amend the test procedures for ASHRAE products to the latest version generally accepted by industry or the rating procedures developed or recognized by AHRI or by ASHRAE, as referenced by ASHRAE/IES Standard 90.1, unless the Secretary determines by clear and convincing evidence that the latest version of the industry test procedure does not meet the requirements for test

[11] For more information *see* California Code of Regulations. Title 20, Public Utilities and Energy, Division 2, State Energy Resources Conservation and Development Commission (August 2008) (Available at: *http://www.energy.ca.gov/2008publications/CEC–140–2008–001/CEC–140–2008–001–REV1.PDF*).

[12] The CEC Appliance Efficiency Database is available at: *http://www.appliances.energy.ca.gov/*.

procedures described in paragraphs (2) and (3) of 42 U.S.C. 6314(a).[13] (42 U.S.C. 6314(a)(4)(B)) ASHRAE Standard 90.1–2010 updated several of its test procedures for ASHRAE products. Specifically, ASHRAE Standard 90.1–2010 updated to the most recent editions of test procedures for small commercial package air conditioners and heating equipment (AHRI 210/240–2008, *Performance Rating of Unitary Air-Conditioning & Air-Source Heat Pump Equipment*), large and very large commercial package air conditioners and heating equipment (AHRI 340/360–2007, *Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment*), commercial warm-air furnaces (UL 727–2006, *Standard for Safety for Oil-Fired Central Furnaces,* and ANSI Z21.47–2006, *Standard for Gas-Fired Central Furnaces*), and commercial water heaters (ANSI Z21.10.3–2006, *Gas Water Heaters, Volume III, Storage Water Heaters with Input Ratings Above 75,000 Btu Per Hour, Circulating and Instantaneous*). Additionally, ASHRAE Standard 90.1–2010 adopts new test procedures for measuring the efficiency of variable refrigerant flow equipment (AHRI 1230–2010, *Performance Rating of Variable Refrigerant Flow (VRF) Multi-Split Air-Conditioning and Heat Pump Equipment*) and air conditioners and condensing units serving computer rooms (ASHRAE 127–2007, *Method of Testing for Rating Computer and Data Processing Room Unitary Air Conditioners*). Lastly, ASHRAE Standard 90.1–2010 specifies ARI 390–2003, *Performance Rating of Single Packaged Vertical Air-Conditioners and Heat Pumps,* as the test procedure for SPVACs and SPVHPs.

DOE has preliminarily reviewed each of the test procedures that were updated in ASHRAE Standard 90.1–2010 and discusses the changes to the test procedures below. For the newly established test procedures AHRI 1230 and ASHRAE 127, DOE is in the process of assessing the appropriateness of these test methods with respect to the requirements for test procedures specified by EPCA pursuant to 42 U.S.C. 6314(a)(4)(B), and will provide a preliminary determination regarding those test procedures in the notice of proposed rulemaking (NOPR) that will follow this NODA. EISA 2007 established separate equipment classes and efficiency levels for SPVACs and SPVHPs, but the statute did not specify test procedures for this equipment. As a result, DOE is also considering the test procedure for SPVACs and SPVHPs in ASHRAE Standard 90.1–2010 (*i.e.,* AHRI 390) pursuant to the requirements in 42 U.S.C. 6314(a)(4)(B), and will provide a preliminary determination regarding that test procedure in the NOPR as well. DOE seeks comment on the appropriateness of AHRI 1230, ASHRAE 127, and AHRI 390 as the test method for VRF equipment, air conditioners and condensing units serving computer rooms, and SPVACs and SPVHPs, respectively. This is identified as Issue 8 in section IV.B, "Issues on Which DOE Seeks Comment."

1. Updates to AHRI 210/240 Test Method

In 2008, AHRI updated AHRI 210/240, *Performance Rating of Unitary Air-Conditioning & Air-Source Heat Pump Equipment,* which is incorporated by reference as the DOE test procedure for commercial small air conditioners and air-source heat pumps with a cooling capacity below 65,000 Btu/h at 10 CFR 431.95. AHRI made numerous reorganizational and additive changes to this standard from the version currently incorporated by reference in DOE's test procedures for commercial air conditioners and heat pumps (*i.e.,* AHRI 210/240–2003).

The AHRI 210/240–2008 test procedure references and includes as Appendix C the DOE test procedure for residential central air conditioners and heat pumps at 10 CFR part 430, subpart B, Appendix M. In section 3 of AHRI 210/240–2008, *Definitions,* AHRI changed the definitions of heating seasonal performance factor (HSPF) and seasonal energy efficiency ratio (SEER) to match the definitions for those terms that are contained in the test procedure for residential central air conditioners and heat pumps (which consequently are also contained in Appendix C of AHRI 210/240–2008). Also, AHRI added definitions for tested combination for multiple-split air conditioners and heat pumps, small-duct, high-velocity systems, space-constrained products, and through-the-wall air conditioners and heat pumps that match DOE's definitions at 10 CFR 430.2.

In section 6, *Rating Requirements,* AHRI updated the tables that specify the standard rating conditions specified for equipment covered by the standard. AHRI reorganized the existing tables for air conditioners and heat pumps, and it created several new tables listing the standard rating conditions for equipment with variable air volume fans, two-stage compressors, or variable-speed compressors. AHRI also added a minimum external static pressure requirement for small-duct, high-velocity systems. In addition to updating the tables and tests in section 6, AHRI also reorganized section 6.1.3.3, *Indoor-Coil Airflow Rate,* and added a new section 6.1.4, *Conditions for Standard Rating Tests* (which is the section where tables discussed above are located).

The updates made to AHRI 210/240–2008 from the 2003 version of the standard were identical to updates made by DOE to its test procedure for residential central air conditioners and heat pumps at 10 CFR part 430, subpart B, Appendix M. The updates discussed in the preceding paragraph were described in detail and previously were evaluated by DOE in two test procedure final rules for residential central air conditioners and heat pumps, published in the **Federal Register** on October 11, 2005 and October 22, 2007. 70 FR 59122; 72 FR 59906. In each of those test procedure amendments, DOE concluded that the changes did not have a significant impact on product efficiency as measured by the test procedure that would cause DOE to revise its existing energy conservation standards. 70 FR 59122, 51932 (Oct. 11, 2005); 72 FR 59906, 59917–18 (Oct. 22, 2007). Because the major changes to AHRI 210/240 have already been approved for the residential central air conditioner and heat pump test procedure and because DOE previously concluded that those changes do not impact the efficiency of residential units, DOE believes that the changes also do not impact the energy efficiency measurements for small commercial air conditioners and heat pumps with a cooling capacity less than 65,000 Btu/h (the ASHRAE equipment for which AHRI 210/240–2008 applies). DOE seeks comments on this tentative conclusion. This is identified as Issue 9 in section IV.B, "Issues on Which DOE Seeks Comment."

2. Updates to AHRI 340/360 Test Method

In 2007, AHRI updated AHRI 340/360, *Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump*

[13] Specifically, the relevant provisions (42 U.S.C. 6314(a)(2)–(3)) provide that test procedures must be reasonably designed to produce test results that reflect energy efficiency, energy use, and estimated operating costs of a type (or class) of industrial equipment during a representative average use cycle, and must not be unduly burdensome to conduct. Moreover, if the test procedure is for determining estimated annual operating costs, it must provide that such costs will be calculated from measurements of energy use in a representative average-use cycle, and from representative average unit costs of the energy needed to operate the equipment during such cycle. The Secretary must provide information to manufacturers of covered equipment regarding representative average unit costs of energy.

Equipment. The primary purpose of the update was to change the part-load rating metric from integrated part-load value (IPLV) to integrated energy efficiency ratio (IEER). AHRI also expanded the scope of the test procedure to include air-cooled packaged unitary air-conditioners with a cooling capacity from 250,000 Btu/h to less than 760,000 Btu/h in addition to equipment that was included in the scope of the previous AHRI 340/360 standard (which covered air-cooled, water-cooled, and evaporatively-cooled unitary air-conditioning, air-source unitary heat pump equipment, and air-conditioning condensing units rated at or above 65,000 Btu/h but below 250,000 Btu/h). AHRI also added a tolerance criterion for the minimum external static pressure test (from −0.0 in H_2O to +0.05 in H_2O). Since DOE does not regulate or require manufacturers to certify part-load ratings, the change from IPLV to IEER does not affect the Federal energy conservation standards. Also, DOE believes that the added tolerance criterion does not significantly impact the measure of energy efficiency. DOE seeks comments on its preliminary determination that the changes to AHRI 340/360–2007 do not significantly impact energy efficiency ratings. This is identified as Issue 9 in section IV.B, "Issues on Which DOE Seeks Comment."

3. Updates to UL 727 Test Method

In 2006, Underwriters Laboratories (UL) updated its standard UL 727, *Standard for Safety for Oil-Fired Central Furnaces.* DOE's test procedure for measuring the energy efficiency of commercial warm-air furnaces at 10 CFR 431.76 only references the procedures pertinent to the measurement of the steady-state efficiency for this equipment in UL 727 (*i.e.,* the measurements described in sections 1 through 3, 37 through 42 (but not 40.4 and 40.6.2 through 40.6.7), 43.2, 44, 45, and 46 of UL 727). Therefore, when reviewing the test procedure, DOE only looked at the changes to these sections. Most of the changes to UL 727 were to reorganize the document and convert it to the Standard Generalized Markup Language (SGML) [14] as a way of keeping the data consistent, reusable, shareable, and portable. In addition, UL removed a section from the scope that allowed a manufacturer to propose appropriate revisions to requirements of UL 727 if the product's new features, components, materials, or systems are unsafe to be tested with the UL 727 Standard, provided that the new revisions conforms to the intent of the Standard. DOE believes that these changes to UL 727–2006 do not significantly impact the energy efficiency ratings and seeks comments as to its tentative conclusion. This is identified as Issue 9 in section IV.B, "Issues on Which DOE Seeks Comment."

[14] SGML is a document markup language developed by the International Organization for Standardization (ISO) to allow for the sharing of machine-readable documents in government or law.

4. Updates to ANSI Z21.47 Test Method

In 2006, the American National Standards Institute (ANSI) updated ANSI Z21.47, *Standard for Gas-Fired Central Furnaces.* DOE's test procedure for measuring the energy efficiency of gas-fired warm air furnaces at 10 CFR 431.76 only references the procedures contained in ANSI Z21.47 that are relevant to the steady-state efficiency measurement (*i.e.,* sections 1.1, 2.1 through 2.6, 2.38, and 4.2.1 of ANSI Z21.47). As a result, DOE focused its test procedure review on the relevant sections of ANSI Z21.47 that DOE's test procedure references. In those sections referenced by DOE's test procedures, ANSI made several updates. First, ANSI updated the scope section to include optional special construction provisions for furnaces designed to operate at altitudes over 2000 feet. ANSI also added an entirely new section for a Proved Igniter and renumbered the other sections to accommodate this addition. The newly added section does not fall under the procedures relevant for steady-state efficiency measurement; however, it does cause the Thermal Efficiency section (which is relevant for the steady-state efficiency measurement) to move from section 2.38 to section 2.39 of the test procedure. DOE preliminarily determined that these changes to ANSI Z21.47–2006 do not impact the energy efficiency ratings for gas-fired furnaces and seeks comments regarding this tentative conclusion. This is identified as Issue 9 in section IV.B, "Issues on Which DOE Seeks Comment."

5. Updates to ANSI Z21.10.3 Test Method

In 2004, ANSI updated ANSI Z21.10.3, *Gas Water Heaters, Volume III, Storage Water Heaters with Input Ratings Above 75,000 Btu Per Hour, Circulating and Instantaneous.* DOE's test procedure for gas-fired water heaters at 10 CFR 431.106 only references sections 2.9 (Thermal Efficiency) and 2.10 (Standby Loss) of the ANSI Z.21.10 test procedure. Accordingly, DOE's review focused on those sections, as well as any other sections to which sections 2.9 and 2.10 refer. In the updated version, ANSI moved both of these sections to Exhibit G. In addition, ANSI added a provision to limit the duration of the standby loss test to a maximum of 48 hours if there is no cutout (*i.e.,* the thermostat acts to shut off the burner) after the 24-hour mark. Currently, there is already an additional stipulation in DOE's test procedure at 10 CFR 431.106 that the standby test should last from the first fuel and/or electric consumption measurement until either the first cutout after the 24-hour mark or a maximum of 48 hours, if the water heater is not in the heating mode at that time. This stipulation was added by a direct final rule amending the test procedure for commercial water heaters (which was published on October 21, 2004) to limit the duration of the standby test and reduce the testing burden for manufacturers. 69 FR 61974, 61979.

DOE notes that its provision limiting the duration of the standby loss test is slightly different than the provision included in ANSI Z 21.10.3–2004. Using DOE's test procedure, if the water heater is in heating mode at the 48-hour mark, the tester is instructed to let the heating mode complete before ending the test. However, the updated ANSI Z21.10.3 test method directs the tester to end the test at 48 hours regardless of whether the water heater is in heating mode. DOE believes that this slight difference between the ANSI test procedure and the current DOE test procedure may have a very small impact on the measured energy efficiency if the water heater has not yet cut off after 24 hours and is in heating mode at the 48-hour mark. In such a situation, the DOE test procedure would allow the water heater to continue operating in heating mode to continue until a cutout before ending the test, whereas the ANSI test method would end the test immediately and possibly not capture the energy used during that final heating cycle. However, as noted above, DOE's test procedure already includes a provision to address the standby mode energy loss that is independent of the ANSI Z21.10.3 test method. Therefore, the update to the provision for the duration of the standby mode test in ANSI Z21.10.3 would be superseded by DOE's test requirements at 10 CFR 431.106 and would not change the standby test method. As a result, DOE believes that the new changes to ANSI Z21.10.3 would not significantly affect the measure of energy efficiency. DOE seeks comment regarding its preliminary conclusion that the updated ANSI Z21.10.3–2004 does not significantly impact energy efficiency ratings of commercial gas-fired water heaters. This is identified as Issue 9 in section IV.B, "Issues on Which DOE Seeks Comment."

III. Analysis of Potential Energy Savings

As required under 42 U.S.C. 6313(a)(6)(A), DOE performed an analysis to determine the energy-savings potential of amending Federal minimum energy conservation standard levels to the efficiency levels specified in ASHRAE Standard 90.1–2010, as well as more-stringent efficiency levels than those specified in ASHRAE Standard 90.1–2010. As explained above, DOE's energy-savings analysis is limited to types of equipment covered by Federal energy conservation standards for which the amended ASHRAE Standard 90.1–2010 increased the efficiency levels and for which a market exists and sufficient data are available.[15] Based upon the conclusions reached in section II, DOE is conducting the energy-savings analysis for eight equipment classes of water-cooled and evaporatively-cooled products: (1) Small water-cooled air conditioners with electric resistance or no heating (65,000 to less than 135,000 Btu/h); (2) small water-cooled air conditioners with other heating (65,000 to less than 135,000 Btu/h); (3) large water-cooled air conditioners with electric resistance or no heating (135,000 to less than 240,000 Btu/h); (4) large water-cooled air conditioners with other heating (135,000 to less than 240,000); (5) very large water-cooled air conditioners with electric resistance or no heating (240,000 Btu/h to less than 760,000 Btu/h); (6) very large water-cooled air conditioners with other heating (240,000 Btu/h to less than 760,000 Btu/h); (7) very large evaporatively-cooled air conditioners with electric resistance or no heating (240,000 Btu/h to less than 760,000 Btu/h); and (8) very large evaporatively-cooled air conditioners with other heating (240,000 Btu/h to less than 760,000 Btu/h).

In addition, although ASHRAE did not increase the efficiency level for SPVACs and SPVHPs, DOE is required by EPCA to consider amending the energy conservation standards for these equipment classes using the procedures set forth by 42 U.S.C. 6313(a)(6) for ASHRAE products. Accordingly, DOE also performed an energy-savings analysis for four equipment classes of SPVACs and SPVHPs where there is a market and sufficient data are available: (1) Single-phase SPVACs under 65,000 Btu/h; (2) three-phase SPVACs under 65,000 Btu/h; (3) single-phase SPVHPs under 65,000 Btu/h; and (4) three-phase SPVHPs under 65,000 Btu/h.

The following discussion provides an overview of the energy-savings analysis conducted for these twelve classes of products, followed by summary results of that analysis. For each efficiency level analyzed, DOE calculated the potential energy savings to the Nation as the difference between a base-case forecast (without amended standards) and the standards-case forecast (with amended standards). The national energy savings (NES) refers to cumulative energy savings for a 30-year period that differs by product. The analysis is based on a stock accounting method. In the standards case, equipment that is more efficient gradually replaces less-efficient equipment over time. This affects the calculation of the potential energy savings, which are a function of the total number of units in use and their efficiencies. Savings depend on annual shipments and equipment lifetime. Inputs to the energy-savings analysis are presented below, and details are available in the ASHRAE NODA TSD on DOE's website.[16]

While DOE did not have sufficient data to follow this analytical method for large SPVACs, DOE approximated the energy savings potential for this product class based on the energy savings results from the small SPVAC product classes. The calculation method and results for estimating the energy savings potential for large SPVACs are summarized in section III.D.

A. Annual Energy Use

DOE's analysis of the annual unit energy consumption (UEC) for each class of equipment analyzed was based on the use of building simulation models or previously available building simulation data for equipment at or near the current Federal standard baseline for each equipment class analyzed. DOE then used a scaling process to assess the UEC corresponding to higher efficiency levels, including the efficiency levels provided in ASHRAE 90.1–2010. These UEC estimates form the basis of the national energy savings estimates discussed in section III.D.

This section describes the energy use analysis performed for water-cooled and evaporatively-cooled products, as well as for SPVUs. For each of these equipment types, the Federal standard and higher efficiency levels are expressed in terms of an efficiency metric or metrics (EER for cooling efficiency, Coefficient of Performance (COP) for heating efficiency). For each equipment class, this section describes how DOE developed estimates of annual energy consumption at the baseline efficiency level and higher levels for each equipment type. More detailed discussion is found in the ASHRAE NODA TSD.

1. Water-Cooled Air Conditioners

The analysis to assess the per-unit energy saving of water-cooled air conditioners began with review of the existing market, as well as the review of historical shipments data provided by AHRI for the period from 1989–2009.[17] The review of the market for equipment from 65,000 Btu/h to 760,000 Btu/h suggested that most of the water-cooled air conditioner units currently on the market are designed for installation inside of commercial buildings (as opposed to on building rooftops), and the shipments data suggested that in recent years, shipments were dominated by larger equipment (≥ 240,000 Btu/h capacity), with relatively few shipments of smaller-capacity units. Given these findings, DOE's analysis of energy savings focused on typical applications for this larger equipment. Review of manufacturer's literature suggested that a common application is floor-by-floor cooling in a multi-story building.

To provide an estimate of the energy use of water-cooled air conditioners in this application, DOE used annual hourly simulation data developed from computer simulations of a prototypical commercial office building. The prototype building model was a 3-story, 53,600 square foot (sf) commercial office building developed as part of DOE's commercial reference building models.[18] This building has each floor

[15] As discussed in section II, when no products are available on the market or no reliable data exist for calculating potential energy savings, DOE did not perform an analysis. The products for which ASHRAE Standard 90.1–2010 increased the efficiency level, but for which DOE did not perform an analysis due to lack of a market or lack of data include: (1) VRF water-source heat pumps under 17,000 Btu/h (see section II.B.3); (2) VRF water-source heat pumps over 135,000 Btu/h (see section II.B.3); and (3) air conditioners and condensing units serving computer rooms (see section II.C).

[16] The ASHRAE NODA TSD is available on the webpage for ASHRAE Products at: *http://www1.eere.energy.gov/buildings/appliance_standards/commercial/ashrae_products_docs_meeting.html.*

[17] Air-Conditioning, Heating, and Refrigeration Institute, *Historical Shipment Data Commercial Air Conditioners Water Cooled,* 2011. This information was provided by AHRI to the U.S. Department of Energy on March 4, 2011.

[18] The commercial reference building models are available on DOE's website as Energy Plus input files at: *http://www1.eere.energy.gov/buildings/commercial_initiative/new_construction.html.* Documentation of the model development is provided in: Deru, M., *et al.* U.S. Department of Energy Commercial Reference Building Models of the National Building Stock. (NREL/TP–5500–46861) (2011).

served by a separate packaged air-conditioning unit. The hourly data used in this analysis were previously developed from simulations using the DOE EnergyPlus[19] building simulation software and reflected building simulations in 15 climate locations in the U.S., with each climate representing one of 15 climate regions that have been developed in DOE's Building Energy Codes Program and subsequently used in the development of the commercial reference building models.

The office building model selected utilized packaged variable air volume rooftop cooling units in the original reference building simulations, with each packaged unit serving one floor of the office model. DOE determined that the cooling thermal loads from modeling of this type of equipment would be representative of similar cooling distribution systems served by larger water-cooled equipment that also provides floor-by-floor cooling and serves multiple building thermal zones. EnergyPlus does not have an equipment simulation model developed around a water-cooled air conditioner for this application. For this reason, DOE relied on using the previously developed hourly cooling thermal load, air flow, and system air temperature data for the air-cooled packaged rooftop equipment used in the medium office reference building model. Since the thermal loads for the specific application would be essentially the same whether served by air-cooled or water-cooled packaged cooling equipment, and since the water-cooled packaged air conditioner equipment performance would be modeled explicitly in the spreadsheet, DOE believes this is approach provides an accurate method of estimating energy consumption for the water-cooled equipment classes.

To process the hourly data into annual equipment energy consumption for water-cooled air conditioners, DOE developed a spreadsheet model of the typical equipment performance using actual manufacturer performance data for a 25-ton water-cooled air conditioner. Cooling capacity and condenser power consumption curve fits to this data were developed using polynomial relationships and the independent variables recommended for modeling of cooling efficiency for water-source heat pumps in Energy Plus. In addition, DOE used part-load performance degradation curves previously developed for air-source air conditioners that already existed in the medium office reference building model. As these part-load curves reflect the effects of compressor cycling at part load, it was determined that these curves should be representative of the compressor cycling impacts for water-cooled air conditioners as well.

For each climate, DOE's spreadsheet model sized the equipment to reflect the sizing in the original simulation's hourly load data. To accurately account for fan power, DOE used the normalized fan power-versus-supply air flow curves in the original office reference building model.

The performance equations developed in this spreadsheet model separately accounted for the water-cooled gross cooling capacity and power consumption as a function of entering air conditions and supply water temperature and flow rate. In addition, the spreadsheet model requires an hourly entering water temperature and entering water flow rate. For this analysis, a simple cooling tower supply water temperature model was developed based on a defined control profile with minimum 70 °F return water temperature and using a 7 °F approach temperature (the temperature between the return water temperature from the cooling tower and the outdoor air wet bulb temperature). Condenser water flow rates were assumed to be equivalent to the nominal rating condition water flow rates for all cooling hours.

For analysis of energy use at each specific efficiency (EER) level, DOE first developed estimates for the condenser efficiency (condenser-only cooling COP) based on the nominal rating conditions. This was done by backing out the estimated fan power at nominal rating conditions from the input power and separately accounting for the impact of fan heat to arrive at the gross cooling capacity of the equipment. DOE developed estimates of peak fan power at design air flow conditions and used the fan power versus flow relationships to adjust the fan power appropriately for periods when air flow was not at design air flow rates.

Using the spreadsheet model, for each of the 15 climates, DOE first developed the annual equipment condenser energy consumption and blower energy consumption for nominal 11 EER water-cooled equipment, with 11 EER being the current Federal standard for water-cooled air conditioners with electric resistance or no heating, 240,000 Btu/h to less than 760,000 Btu/h . These were then normalized by dividing by the equipment capacity in cooling tons. The sum of the resulting condenser energy per cooling ton and blower energy per cooling ton represents the annual energy consumption per cooling ton for equipment at the 11 EER efficiency level. The resulting per-ton energy consumption figures were then multiplied by the typical equipment capacities developed for each water-cooled equipment class analyzed to establish the Unit Energy Consumption (UEC) values for each equipment class at that 11 EER level.

To assess the annual energy consumption at the specific efficiency levels analyzed, DOE developed estimates of the condenser-only cooling COP for each efficiency level. It then multiplied the annual condenser energy consumption for the 11 EER equipment for each climate by the ratio of the baseline condenser-only cooling COP to the condenser-only cooling COP at the higher efficiency levels.

The annual fan energy consumption estimates were held constant at the baseline level for all higher standards. A detailed engineering analysis of higher efficiency options might suggest a number of different ways to improve the EER including reducing supply fan energy consumption. However, several downsides to this approach were identified. First, the supply fan accounts for a relatively small portion of the energy use as compared to the condenser at the rating condition. In addition, because it appears that much of this equipment is installed inside the building space, changes which reduce fan power, such as increased case size and lower face velocity over the evaporator coil, would decrease the amount of rentable space available within the building. Accordingly, for the assessment of energy savings in this NODA, supply fan energy use was held constant. The UEC for each efficiency level analyzed is the sum of the annual condenser energy consumption and the fan power. From these climate-region-specific results, DOE developed national average UEC values at each efficiency level using weighting factors developed for medium and large commercial office building floor space as part of the development of the DOE reference building models. A comparison of these office weighting factors with cumulative weighting factors developed for the larger stock of commercial floor space is provided in the ASHRAE NODA TSD.

Table III.1 shows the UEC estimates for the current Federal baseline levels, the proposed ASHRAE levels, and for the higher efficiency levels for the six water-cooled air conditioner classes analyzed.

[19] For more information on EnergyPlus, refer to DOE's EnergyPlus documentation, available at: *http://apps1.eere.energy.gov/buildings/energyplus/energyplus_documentation.cfm.* EnergyPlus software is freely available for public download at: *http://apps1.eere.energy.gov/buildings/energyplus/energyplus_about.cfm.*

TABLE III.1—NATIONAL UEC ESTIMATES FOR WATER-COOLED AIR CONDITIONERS

	Small water-cooled air conditioners electric or no heat 65,000–135,000 Btu/h	Small water-cooled air conditioners other heat 65,000–135,000 Btu/h	Large water-cooled air conditioners electric or no heat 135,000–240,000 Btu/h	Large water-cooled air conditioners other heat 135,000–240,000 Btu/h	Very large water-cooled air conditioners electric or no heat 240,000–760,000 Btu/h	Very large water-cooled air conditioners other heat 240,000–760,000 Btu/h
Average Cooling Capacity (tons)	8	8	15	15	35	35
Efficiency Level (EER)						
Base Case—Federal Standard	11.5	11.3	11.0	11.0	11.0	10.8
Efficiency Level 1	12.1	11.9	12.5	12.3	12.4	12.2
Efficiency Level 2	13.0	13.0	13.0	13.0	13.0	13.0
Efficiency Level 3	14.0	14.0	14.0	14.0	14.0	14.0
Efficiency Level 4	15.0	15.0	15.0	15.0	* NA	* NA
Efficiency Level 5—"Max-Tech"—	16.4	16.4	16.1	16.1	14.8	14.8
Unit Energy Consumption (kWh/yr)						
Base Case—Federal Standard	9,199	9,322	17,838	17,838	41,621	42,205
Efficiency Level 1	8,855	8,966	16,206	16,402	38,041	38,504
Efficiency Level 2	8,396	8,396	15,743	15,743	36,733	36,733
Efficiency Level 3	7,953	7,953	14,911	14,911	34,793	34,793
Efficiency Level 4	7,566	7,566	14,186	14,186	*NA	*NA
Efficiency Level 5—"Max-Tech"—	7,101	7,101	13,490	13,490	33,422	33,422

*An efficiency level 4 was not identified for very large water-cooled air conditioners.

2. Evaporatively-Cooled Air Conditioners

The analysis to assess the per-unit energy use of evaporatively-cooled air conditioners began with review of the existing market. DOE did not identify any current models of evaporatively-cooled air conditioners with less than 240,000 Btu/h cooling capacity. The review of the market suggested that all of the currently shipping units appeared to be packaged rooftop evaporatively-cooled air conditioner units. Based on the available models, DOE estimated the average capacity at 40 tons. Because of this, DOE's analysis of energy savings focused on typical applications for the very large equipment class. Because of the large capacity, DOE believes that a common system design would also be a packaged variable air volume (VAV) system. DOE modified the 3-story office reference building model discussed previously to serve as the simulation model for the very large evaporatively-cooled air conditioner equipment class.

The Energy Plus simulation tool has the capability to model evaporatively-cooled unitary air conditioners with only minor modifications from the air-cooled unitary air conditioner equipment models that were used in the original DOE medium office reference building model. DOE was not able to derive separate performance curves for evaporatively-cooled equipment, as these data were not available in the manufacturer literature reviewed. Therefore, DOE modified the air-cooled model using simulation defaults provided in the Energy Plus documentation for modeling evaporatively-cooled air conditioners. These modifications are discussed in the ASHRAE NODA TSD.

DOE performed simulations of the medium office reference building model in the 15 climates identified previously at an 11 EER efficiency level, because 11 EER is the current Federal standard for evaporatively-cooled air conditioners with electric resistance or no heating. To do this, DOE first developed estimates for the condenser-only cooling COP based on the nominal rating conditions as input for the simulation models. DOE used the fan power performance curves and peak fan power assumptions in the reference building model directly.

Using the spreadsheet model, for each of the 15 climates, DOE developed the annual equipment condenser energy consumption and blower energy consumption for the 11 EER evaporatively-cooled equipment simulated. These values were then normalized by dividing by the equipment capacity in cooling tons. The sum of the resulting condenser energy per cooling ton and blower energy per cooling ton represents the annual energy consumption per cooling ton for equipment at that 11 EER efficiency level. These per-ton energy consumption figures were then multiplied by the selected equipment capacities for the evaporatively-cooled equipment class analyzed to establish the UEC values for each equipment class at an 11 EER level.

To assess the annual energy consumption at the specific efficiency levels analyzed, DOE developed estimates of the condenser-only cooling COP for each efficiency level. It then multiplied the baseline annual condenser energy consumption developed for each climate by the ratio of the baseline condenser-only cooling COP at 11 EER to the condenser-only cooling COP at the efficiency levels analyzed.

The annual fan energy consumption estimates were held constant at the baseline level for all higher standards. As with water-cooled air conditioners, a detailed engineering analysis might suggest that reduction in supply fan power might be a path to improved EER; however, DOE did not conduct such a detailed analysis. Because supply fan power is a relatively small fraction of total system power at rating conditions, DOE concluded that improvement in condenser efficiency is likely a necessary path to achieve the most significant system efficiency improvements. The UEC for each efficiency level analyzed is the sum of the annual condenser energy consumption and the fan power. As with water-cooled air conditioners discussed previously, DOE developed national average UEC values at each efficiency level using weighting factors developed for medium and large commercial office building floor space as part of the development of the DOE reference building models.

Table III.2 shows the unit energy consumption estimates for the current Federal baseline levels, the proposed ASHRAE levels, and for the higher efficiency levels for the very large evaporatively-cooled air conditioner classes.

TABLE III.2—NATIONAL UEC ESTIMATES FOR EVAPORATIVELY-COOLED AIR CONDITIONERS

	Large evaporatively-cooled air conditioner electric or no heat 240,000–760,000 Btu/h	Large evaporatively-cooled air conditioner other heat 240,000–760,000 Btu/h
Average Cooling Capacity (tons)	40	40
Efficiency Level (EER)		
Base case	11.0	10.8
Level 1—ASHRAE	11.9	11.7
Level 2	12.5	12.5
Max Tech	13.1	13.1
Unit Energy Consumption (kWh/yr)		
Base case	47,171	47,766
Level 1—ASHRAE	44,732	45,243
Level 2	43,294	43,294
Max Tech	41,983	41,983

3. Single-Package Vertical Air Conditioners and Heat Pumps

Based on data developed during previous analysis of SPVU equipment by DOE,[20] the Department believes that approximately 60 percent of the SPVU shipments go to educational facilities, the majority of which are for space conditioning of modular classroom buildings. Another approximately 20 percent of the shipments go to providing cooling for non-comfort cooling applications such as telecommunications and electronics enclosures. The remainder is used in a wide variety of commercial buildings including offices, temporary buildings, and some lodging facilities. In many of these commercial building applications, the buildings served are expected to be of modular construction.

For its initial estimate of energy savings for SPVAC and SPVHP, DOE focused its analysis on the education market, in particular, modular classrooms, which DOE believes to represent the majority of the usage for this equipment. To estimate the energy use of single-package vertical air conditioners and heat pumps in these educational facilities, DOE developed a modular classroom building simulation model using the Energy Plus software. Schedules and load profiles were taken from classroom-space data found in the DOE Primary School reference building models. Internal loads were based on equipment power and occupancy figures for the primary school reference building model. Lighting power requirements were based on levels found in ASHRAE Standard 90.1–2004. DOE believes that this is largely representative of classroom lighting power in the building stock.

DOE simulated this building in each of the 15 climates as was done for water-cooled air conditioners and evaporatively-cooled air conditioners. Simulations were done for the buildings with SPVAC equipment and electric resistance heating, and then a separate set of simulations was done for buildings with SPVHP equipment. DOE used the current Federal standard efficiencies of 9.0 EER for SPVAC equipment and 9.0 EER and 3.0 COP for SPVHP equipment in the ≤65,000 Btu/h cooling capacity range. Fan power at these efficiency levels was based on manufacturers' literature and reported fan power consumption data. In addition, based on DOE's review of the existing market, the supply air blower motors for this baseline equipment used permanent split-capacitor motors.

Using the fan power data, DOE converted the baseline EER to condenser cooling COP at rating conditions. DOE converted the baseline heating COP to condenser heating COP at the heating rating conditions. These values were used as inputs for the equipment simulations. Further details of the building model and the simulation inputs used for modeling the energy consumption of the SPVAC and SPVHP equipment can be found in the ASHRAE NODA TSD.

From the annual simulation results for SPVAC equipment, DOE extracted the condenser energy use for cooling, the blower energy use, and the equipment capacity. From these, DOE developed the annual cooling energy per ton and annual blower energy per ton for the baseline efficiency simulated. These per-ton values were then added together and multiplied by the average cooling capacity estimated for SPVUs in the ≤65,000 Btu/h capacity range to arrive at the baseline UEC for SPVAC. This average unit capacity was estimated at 3 tons (*i.e.,* 36,000 Btu/h).

To estimate the UEC for higher efficiency levels for SPVAC, DOE multiplied the baseline condenser cooling energy by the ratio of the baseline condenser cooling COP to the condenser cooling COP calculated for higher efficiency levels. As a review of the market indicated that ECM motors were the norm at high efficiency levels

[20] U.S. Department of Energy, Technical Support Document: Energy Efficiency Program for Commercial and Industrial Equipment: Efficiency Standards for Commercial Heating, Air-Conditioning, and Water Heating Equipment Including Packaged Terminal Air-Conditioners and Packaged Terminal Heat Pumps, Small Commercial Packaged Boiler, Three-Phase Air-Conditioners and Heat Pumps <65,000 Btu/h, and Single-Package Vertical Air Conditioners and Single-Package Vertical Heat Pumps <65,000 Btu/h (March 2006) (Available at: *http://www1.eere.energy.gov/buildings/appliance_standards/commercial/ashrae_products_docs_meeting.html*).

(with a corresponding lower fan power), DOE used the available market data to establish estimates of the fraction of the market using ECM motors at each higher efficiency level analyzed. It then calculated the blower energy consumption per ton for both the baseline fan power (PSC motor) and the fan power assuming ECM motors. The latter was achieved by multiplying the baseline fan energy consumption by the ratio of the rated fan power reported for products using ECM motors to the rated fan power for products using PSC blower motors. Using the relative market fractions of the SPVACs and SPVHPs using each motor at approximately the efficiency levels analyzed, DOE developed weighted-average annual fan energy consumption for each higher efficiency level. The condenser energy per ton and blower energy per ton at each efficiency level were then added together and the result multiplied by the 3-ton average capacity to develop SPVAC UEC estimates for each higher efficiency level analyzed.

The analytical method for SPVHP was carried out in a similar fashion; however, for heat pumps, DOE included the heating energy from the simulation results. From the SPVHP simulation results at the baseline 9.0 EER and 3.0 COP levels, DOE extracted the compressor cooling energy, blower energy, compressor heating energy, backup electric resistance heating energy, and the cooling capacity. From these, DOE developed per-ton energy consumption values for each of these four electrical loads. These per-ton energy figures were summed and multiplied by the nominal capacity to arrive at the baseline UEC for SPVHP. To establish UEC estimates for higher efficiency levels, the baseline condenser cooling energy was scaled by multiplying it by the ratio of the baseline condenser-only cooling COP to that of the condenser-only cooling COP for each higher efficiency level. Similarly, for the analysis of higher COP efficiencies, the condenser heating energy was multiplied by the ratio the baseline condenser-only heating COP to that of the condenser-only heating COP calculated for the higher efficiency levels. The annual blower energy consumption was calculated based on the estimated relative fractions for ECM and PSC motors for each analyzed efficiency levels. The backup electric resistance heat from the baseline simulations was not adjusted for higher efficiency levels, because it was assumed to be unaffected by higher efficiency levels. These scaled electrical consumption values for these four energy uses were then summed to provide the UEC estimate for each higher efficiency level. For details of this analysis, see the ASHRAE NODA TSD.

DOE developed national average UEC values at each efficiency level using weighting factors developed for primary and secondary school education building floor space as part of the development of the DOE reference building models.

Table III.3 shows the annual UEC estimates for SPVAC and SPVHP corresponding to the EER and COP levels analyzed. Note that Level 2, with an EER of 10.0, matches the minimum standard for SPVUs in Proposed Addendum i to ASHRAE Standard 90.1–2010. Therefore, although DOE analyzed SPVUs under a separate requirement from an amendment to ASHRAE Standard 90.1 (as discussed in section I.A), potential energy savings for this level provide an estimate of the savings that would occur should this addendum be approved.

TABLE III.3—NATIONAL UEC ESTIMATES FOR SPVAC AND SPVHP EQUIPMENT

	SPVAC 1-phase <65,000 Btu/h	SPVAC 3-phase <65,000 Btu/h	SPVHP 1-phase <65,000 Btu/h		SPVHP 3-phase <65,000 Btu/h	
Average Capacity (tons)	3	3	3	3	3	3
	Efficiency Level (EER)					
	EER	EER	EER	COP	EER	COP
Baseline	9.0	9.0	9.0	3.0	9.0	3.0
Level 1	9.5	9.5	9.5	3.1	9.5	3.0
Level 2	10.0	10.0	10.0	3.1	10.0	3.1
Level 3	11.0	11.0	11.0	3.2	11.0	3.2
Level 4	12.0	12.0	12.0	3.3	12.0	3.3
Level 5—"Max-Tech"	12.6	12.6	12.5	3.4	12.5	3.3
	Unit Energy Consumption (kWh/yr)					
Baseline	6,660	6,660	6,648	6,280	6,648	6,281
Level 1	6,301	6,301	6,290	6,234	6,290	6,240
Level 2	5,962	5,962	5,952	6,189	5,952	6,201
Level 3	5,537	5,537	5,325	6,105	5,325	6,126
Level 4	5,057	5,057	5,048	6,026	5,048	6,055
Level 5—"Max-Tech"	4,911	4,911	4,925	5,988	4,925	6,021

DOE seeks input on its analysis of UEC for the above equipment classes and its use in establishing the energy savings potential for higher standards. Of particular interest, DOE is seeking input on the other building applications for SPVU equipment and the value of incorporating them into its analysis. DOE identified this as Issue 10 under "Issues on Which DOE Seeks Comment" in section IV.B of this NODA.

B. Shipments

DOE obtained historical (1989–2009) water-cooled commercial air conditioner shipment data from AHRI.[21] Table III.4 exhibits the shipment data provided for a selection of years, while the full data set can be found in the

[21] Air-Conditioning, Heating, and Refrigeration Institute, *Historical Shipment Data Commercial Air Conditioners Water Cooled,* 2011. This information was provided by AHRI to the U.S. Department of Energy on March 4, 2011. (AHRI, No. 0002 at p. 2)

ASHRAE NODA TSD. DOE used these shipment data to create two shipment scenarios: (1) Based on historical trends, and (2) shipments held constant at 2009 levels. For small and large AC, the historical trends are exponential (decreasing), while for very large AC, the closest trend is linear (decreasing). As these trends result in few shipments by the end of the analysis period, DOE used the second shipment scenario to represent more of an upper bound on shipments.

TABLE III.4—TOTAL SHIPMENTS OF WATER-COOLED AC BY EQUIPMENT CLASS

Equipment class *	1989	1999	2009
Small AC (65,000–134,900 Btu/h)	1,437	874	152
Large AC (135,000–249,000 Btu/h)	793	477	182
Very Large AC (250,000 & Over Btu/h)	1,622	898	585

* Although the Btu/h ranges AHRI uses to categorize equipment into small, large, and very large do not exactly match the definitions for those categories provided in EPCA, in this analysis, DOE did not attempt to adjust the shipments to take into account these small differences.

DOE broke out the shipment data into the discrete classes required for this analysis. DOE could not identify data that would allow the shipments provided by AHRI to be separated into products with electrical resistance or no heating, and those with other types of heating. However, DOE believes that most small and large water-cooled equipment does not provide heating, and as a result, DOE assigned 90 percent of shipments in those categories to the no heating class, and 10 percent to the other heating class. For very large equipment, DOE believes that most equipment are roof-top units that are combined with gas furnaces, and as a result assigned 10 percent of very large shipments to the "no heating class" and 90 percent to the "other heating class."

DOE identified nine models of very large evaporatively-cooled equipment, but no shipment data were available. For this product class, DOE used the ratio of very large evaporatively-cooled to water-cooled models on the market (9:35) and applied this ratio to the water-cooled shipments to estimate evaporatively-cooled shipments. The same fraction as for very large water-cooled equipment was used to separate units into the relevant heating categories.

The complete historical data set and the projected shipments for each equipment class can be found in the ASHRAE NODA TSD. DOE seeks input on its allocation of shipments to the eight classes of water-cooled and evaporatively-cooled equipment for which analysis was performed, as well as the future market and shipment scenarios for these products. DOE identified this as Issue 11 under "Issues on Which DOE Seeks Comment" in section IV.B of this NODA.

For SPVUs, DOE did not create two shipment scenarios, but rather relied upon SPVU shipment data from the Technical Support Document for the March 13, 2006 Notice of Document Availability on Efficiency Standards for Commercial Heating, Air-Conditioning, and Water Heating Equipment.[22] In this document, DOE provided 2005 shipments data based on Air-Conditioning and Refrigeration Institute (ARI, now AHRI) estimates, as shown in Table III.5.

TABLE III.5—TOTAL SHIPMENTS OF SPVUS BY EQUIPMENT CLASS

Equipment class	2005
SPVAC <65,000 Btu/h, single-phase	31,976
SPVHP <65,000 Btu/h, single-phase	13,125
SPVAC <65,000 Btu/h, three-phase	14,301
SPVHP <65,000 Btu/h, three-phase	6,129

As the market for SPVUs is larger and better understood than the market for water-cooled and evaporatively-cooled products and the estimated growth rate over time is increasing, DOE did not include a shipment scenario with shipments fixed to 2009. DOE only used that scenario for water-cooled and evaporatively-cooled products to provide an upper bound on shipments and energy savings, as it is unclear if the historical trend toward extremely few units in those product classes will continue.

DOE projected shipments of SPVUs according to the average growth rate of 2.18 percent noted in the 2006 TSD. This was based on analysis of AHRI data for commercial unitary AC products 65,000 Btu/h to 240,000 Btu/h for DOE's commercial unitary AC and HP rulemaking.

DOE then reviewed the AHRI certified products directory, as well as manufacturer Web sites, to determine the distribution of efficiency levels for commercially-available models within each equipment class of water-cooled and evaporatively-cooled products and SPVUs. DOE bundled the efficiency levels into "efficiency ranges" and determined the percentage of models within each range. The distribution of efficiencies in the base case for each equipment class can be found in the ASHRAE NODA TSD on DOE's Web site.

For the standards case, DOE assumed shipments at lower efficiencies were most likely to roll up into higher efficiency levels in response to more-stringent energy conservation standards. For each efficiency level analyzed within a given equipment class, DOE used a "roll-up" scenario to establish the market shares by efficiency level for the year that standards become effective (*i.e.,* 2012). DOE estimated that the efficiencies of equipment in the base case that did not meet the standard level under consideration would roll up to meet the standard level. Available information also suggests that all equipment efficiencies in the base case that were above the standard level under consideration would not be affected. Table III.6 shows an example of the distribution of efficiencies within the base-case and the roll-up scenarios to establish the distribution of efficiencies in the standards cases for very large water-cooled equipment. For all the tables of the distribution of efficiencies in the base case and standards cases by equipment class, see the ASHRAE NODA TSD.

[22] U.S. Department of Energy, *Technical Support Document: Energy Efficiency Program for Commercial and Industrial Equipment: Efficiency Standards for Commercial Heating, Air-Conditioning, and Water Heating Equipment Including Packaged Terminal Air-Conditioners and Packaged Terminal Heat Pumps, Small Commercial Packaged Boiler, Three-Phase Air-Conditioners and Heat Pumps <65,000 Btu/h, and Single-Package Vertical Air Conditioners and Single-Package Vertical Heat Pumps <65,000 Btu/h* (March 2006).

TABLE III.6—DISTRIBUTION OF EFFICIENCIES IN THE BASE CASE AND STANDARDS CASES FOR VERY LARGE WATER-COOLED COMMERCIAL AC WITH OTHER HEAT

Efficiency level	Efficiency ranges (EER) *				
	10.8–11.59	11.6–12.69	12.7–13.49	13.5–14.39	14.4–14.89
Base Case—Federal Standard (10.8 EER)	14%	23%	29%	14%	20%
Efficiency Level 1—ASHRAE (12.2 EER)		37%	29%	14%	20%
Efficiency Level 2—(13.0 EER)			66%	14%	20%
Efficiency Level 3—(14.0 EER)				80%	20%
Efficiency Level 5—“Max-Tech”—(14.8 EER)					100%

* DOE binned models into efficiency ranges surrounding the EER of each efficiency level; the specific bins were chosen to maintain the same market average efficiency (when the number of models in each range is multiplied by the efficiency level EER) as calculated using the full distribution of models.

DOE seeks input on its determination of the base-case distribution of efficiencies and its prediction on how amended energy conservation standards affect the distribution of efficiencies in the standards case. DOE identified this as Issue 12 under “Issues on Which DOE Seeks Comment” in section IV.B of this NODA.

Using the distribution of efficiencies in the base case and in the standards cases for each equipment class analyzed in today’s NODA, as well as the UECs for each specified EER (discussed previously), DOE calculated market-weighted average efficiency values. The market-weighted average efficiency value represents the average efficiency of the total units shipped at a specified amended standard level. The market-weighted average efficiency values for the base case and the standards cases for each efficiency analyzed within the equipment classes is provided in the ASHRAE NODA TSD found on DOE’s Web site.

C. Other Analytical Inputs

1. Site-to-Source Conversion

DOE converted the annual site energy savings into the annual amount of energy saved at the source of electric generation (*i.e.,* primary energy), using site-to-source conversion factors over the analysis period (calculated from the Energy Information Agency’s (EIA’s) *Annual Energy Outlook 2010* (*AEO2010*) projections).[23] DOE derived the annual conversion factors by dividing the delivered electricity to the commercial sector plus loss for each forecast year in the United States, as indicated in *AEO2010,* by the delivered electricity to the commercial sector for each forecasted year.

2. Product Lifetime

For both water-cooled and evaporatively-cooled products and SPVUs, DOE estimated the product lifetime from the advanced notice of proposed rulemaking on Energy Conservation Standards for Commercial Unitary Air Conditioners and Heat Pumps published in the **Federal Register** on July 29, 2004. 69 FR 45460, 45480. The product lifetime from the prior TSD was estimated to be a mean of 15.4 years. More recent sources confirm this estimate including the 2008 California Database for Energy Efficient Resources (15 years).[24] For this preliminary analysis, DOE used a single-value lifetime of 15 years.

3. Compliance Date and Analysis Period

For purposes of calculating the national energy savings (NES) for water-cooled and evaporatively-cooled equipment, DOE used an analysis period of 2013 (the assumed compliance date if DOE were to adopt the ASHRAE levels as Federal standards for small products) or 2014 (the assumed compliance date if DOE were to adopt the ASHRAE levels as Federal standards for large and very large products) through 2042 and 2043, respectively. This is the standard analysis period of 30 years that DOE typically uses in its NES analysis. While the analysis period remains the same for assessing the energy savings of Federal standard levels higher than the ASHRAE levels, those energy savings would not begin accumulating until 2017 (the assumed compliance date if DOE were to determine that standard levels more stringent than the ASHRAE levels are justified).

If DOE were to propose a rule prescribing energy conservation standards at the efficiency levels contained in ASHRAE Standard 90.1–2010, EPCA states that any such standards shall become effective on or after a date which is two or three years (depending on equipment size) after the effective date of the applicable minimum energy efficiency requirement in the amended ASHRAE standard (*i.e.,* ASHRAE Standard 90.1–2010). (42 U.S.C. 6313(a)(6)(D)) For all water-cooled and evaporatively-cooled equipment in this rulemaking, the effective date in ASHRAE Standard 90.1–2010 is June 1, 2011. Thus, if DOE decides to adopt the levels in ASHRAE Standard 90.1–2010, the rule would apply to small equipment (two product classes) manufactured on or after June 1, 2013, which is two years from the effective date specified in ASHRAE Standard 90.1–2010, and to large and very large equipment (six product classes) manufactured on or after June 1, 2014, which is three years from the effective date specified in ASHRAE Standard 90.1–2010.

If DOE were to propose a rule prescribing energy conservation standards higher than the efficiency levels contained in ASHRAE Standard 90.1–2010, under EPCA, any such standard will become effective for products manufactured four years after the date of publication in the **Federal Register**. (42 U.S.C. 6313(a)(6)(D)) Thus, for products for which DOE might adopt a level more stringent than the ASHRAE efficiency level, the rule would apply to products manufactured on or after a date which is four years from the date of publication of the final rule adopting standards higher than the ASHRAE efficiency levels (30 months after publication of the revised ASHRAE Standard 90.1, which was October 29, 2010). Under this timeline, compliance with such more-stringent standards would be required no later than April 29, 2017.

For purposes of calculating the NES for SPVUs, DOE used a 30-year analysis period of 2017–2046. As all efficiency levels being considered for SPVUs are higher than the ASHRAE efficiency levels, any rule adopted would apply to products manufactured on or after a date which is four years from the date of publication of the final rule adopting standards higher than the ASHRAE

[23] *AEO2010* can be accessed at: *http://www.eia.doe.gov/oiaf/archive/aeo10/index.html.*

[24] California Public Utility Commission 2008, Database for Energy Efficient Resources (Available at: *http://www.deeresources.com/).*

efficiency levels (30 months after publication of the revised ASHRAE Standard 90.1, which was October 29, 2010). Under this timeline, compliance with such more-stringent standards would be required no later than April 29, 2017.

For each equipment class for which DOE developed a potential energy savings analysis, Table III.7 exhibits the approximate compliance dates of an amended energy conservation standard.

TABLE III.7—APPROXIMATE COMPLIANCE DATE OF AN AMENDED ENERGY CONSERVATION STANDARD FOR EACH EQUIPMENT CLASS

Equipment class	Approximate compliance date for adopting the efficiency levels in ASHRAE standard 90.1–2010	Approximate compliance date for adopting more stringent efficiency levels than those in ASHRAE standard 90.1–2010
Small Water-Cooled AC with Electric Resistance or No Heat	06/2013	04/2017
Small Water-Cooled AC with Other Heat	06/2013	04/2017
Large Water-Cooled AC with Electric Resistance or No Heat	06/2014	04/2017
Large Water-Cooled AC with Other Heat	06/2014	04/2017
Very Large Water-Cooled AC with Electric Resistance or No Heat	06/2014	04/2017
Very Large Water-Cooled AC with Other Heat	06/2014	04/2017
Very Large Evaporatively-Cooled AC with Electric Resistance or No Heat	06/2014	04/2017
Very Large Evaporatively-Cooled AC with Other Heat	06/2014	04/2017
SPVAC <65,000 Btu/h, single-phase	* N/A	04/2017
SPVAC <65,000 Btu/h, three-phase	* N/A	04/2017
SPVHP <65,000 Btu/h, single-phase	* N/A	04/2017
SPVHP <65,000 Btu/h, three-phase	* N/A	04/2017

* The efficiency levels specified for SPVACs and SPVHPs in ASHRAE 90.1–2010 are already in effect as Federal minimum energy conservation standards.

D. Estimates of Potential Energy Savings

DOE estimated the potential primary energy savings in quads (*i.e.,* 10^{15} Btu) for each efficiency level considered within each equipment class analyzed. Table III.8—Table III.19 show the potential energy savings resulting from the analyses conducted as part of this NODA.

TABLE III.8—POTENTIAL ENERGY SAVINGS FOR SMALL WATER-COOLED EQUIPMENT WITH ELECTRIC RESISTANCE OR NO HEAT

Efficiency level	Primary energy savings estimate * (quads)	
	Historical shipment trend	Shipments fixed to 2009
Level 1—ASHRAE—12.1 EER	0.000005	0.000011
Level 2—13 EER	0.000018	0.000060
Level 3—14 EER	0.000044	0.000144
Level 4—15 EER	0.000074	0.000238
Level 5—“Max-Tech”—16.4 EER	0.000121	0.000388

* The potential energy savings for efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2010 were calculated relative to the efficiency levels that would result if ASHRAE Standard 90.1–2010 standards were adopted.

TABLE III.9—POTENTIAL ENERGY SAVINGS ESTIMATES FOR SMALL WATER-COOLED EQUIPMENT WITH OTHER HEAT

Efficiency level	Primary energy savings estimate * (quads)	
	Historical shipment trend	Shipments fixed to 2009
Level 1—ASHRAE—11.9 EER	0.0000005	0.0000013
Level 2—13 EER	0.0000024	0.0000082
Level 3—14 EER	0.0000053	0.0000174
Level 4—15 EER	0.0000085	0.0000276
Level 5—“Max-Tech”—16.4 EER	0.0000137	0.0000441

* The potential energy savings for efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2010 were calculated relative to the efficiency levels that would result if ASHRAE Standard 90.1–2010 standards were adopted.

TABLE III.10—POTENTIAL ENERGY SAVINGS ESTIMATES FOR LARGE WATER-COOLED EQUIPMENT WITH ELECTRIC RESISTANCE OR NO HEAT

Efficiency level	Primary energy savings estimate * (quads)	
	Historical shipment trend	Shipments fixed to 2009
Level 1—ASHRAE—12.5 EER	0.00014	0.00027
Level 2—13 EER	0.00002	0.00008
Level 3—14 EER	0.00013	0.00032
Level 4—15 EER	0.00024	0.00056
Level 5—"Max-Tech"—16.1 EER	0.00039	0.00089

* The potential energy savings for efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2010 were calculated relative to the efficiency levels that would result if ASHRAE Standard 90.1–2010 standards were adopted.

TABLE III.11—POTENTIAL ENERGY SAVINGS ESTIMATES FOR LARGE WATER-COOLED EQUIPMENT WITH OTHER HEAT

Efficiency level	Primary energy savings estimate * (quads)	
	Historical shipment trend	Shipments fixed to 2009
Level 1—ASHRAE—12.3 EER	0.00001	0.00003
Level 2—13 EER	0.00001	0.00001
Level 3—14 EER	0.00002	0.00004
Level 4—15 EER	0.00003	0.00007
Level 5—"Max-Tech"—16.1 EER	0.00005	0.00010

* The potential energy savings for efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2010 were calculated relative to the efficiency levels that would result if ASHRAE Standard 90.1–2010 standards were adopted.

TABLE III.12—POTENTIAL ENERGY SAVINGS ESTIMATES FOR VERY LARGE WATER-COOLED EQUIPMENT WITH ELECTRIC RESISTANCE OR NO HEAT

Efficiency level	Primary energy savings estimate * (quads)	
	Historical shipment trend	Shipments fixed to 2009
Level 1—ASHRAE—12.4 EER	0.0002	0.0001
Level 2—13 EER	0.0001	0.0001
Level 3—14 EER	0.0005	0.0003
Level 4—"Max-Tech"—14.8 EER	0.0008	0.0005

* The potential energy savings for efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2010 were calculated relative to the efficiency levels that would result if ASHRAE Standard 90.1–2010 standards were adopted.

TABLE III.13—POTENTIAL ENERGY SAVINGS ESTIMATES FOR VERY LARGE WATER-COOLED EQUIPMENT WITH OTHER HEAT

Efficiency level	Primary energy savings estimate * (quads)	
	Historical shipment trend	Shipments fixed to 2009
Level 1—ASHRAE—12.2 EER	0.002	0.001
Level 2—13 EER	0.001	0.001
Level 3—14 EER	0.005	0.003
Level 4—"Max-Tech"—14.8 EER	0.008	0.005

* The potential energy savings for efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2010 were calculated relative to the efficiency levels that would result if ASHRAE Standard 90.1–2010 standards were adopted.

TABLE III.14—POTENTIAL ENERGY SAVINGS ESTIMATES FOR VERY LARGE EVAPORATIVELY-COOLED EQUIPMENT WITH ELECTRIC RESISTANCE OR NO HEAT

Efficiency level	Primary energy savings estimate * (quads)	
	Historical shipment trend	Shipments fixed to 2009
Level 1—ASHRAE—11.9 EER	0.00013	0.00009
Level 2—12.5 EER	0.00008	0.00005
Level 3—"Max-Tech"—13.1 EER	0.00017	0.00011

* The potential energy savings for efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2010 were calculated relative to the efficiency levels that would result if ASHRAE Standard 90.1–2010 standards were adopted.

TABLE III.15—POTENTIAL ENERGY SAVINGS ESTIMATES FOR VERY LARGE EVAPORATIVELY-COOLED EQUIPMENT WITH ELECTRIC RESISTANCE OR NO HEAT

Efficiency level	Primary energy savings estimate* (quads)	
	Historical shipment trend	Shipments fixed to 2009
Level 1—ASHRAE—11.7 EER **	0.0011	0.0007
Level 2—12.5 EER	0.0010	0.0007
Level 3—"Max-Tech"—13.1 EER	0.0019	0.0012

* The potential energy savings for efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2010 were calculated relative to the efficiency levels that would result if ASHRAE Standard 90.1–2010 standards were adopted.

TABLE III.16—POTENTIAL ENERGY SAVINGS ESTIMATES FOR SMALL SINGLE-PHASE SPVAC

Efficiency level	Primary energy savings estimate (quads)
Level 1—9.5 EER	0.035
Level 2—10 EER	0.076
Level 3—11 EER	0.139
Level 4—12 EER	0.226
Level 5—"Max-Tech"—12.6 EER	0.253

TABLE III.17—POTENTIAL ENERGY SAVINGS ESTIMATES FOR SMALL THREE-PHASE SPVAC

Efficiency level	Primary energy savings estimate (quads)
Level 1—9.5 EER	0.010
Level 2—10 EER	0.023
Level 3—11 EER	0.046
Level 4—12 EER	0.083
Level 5—"Max-Tech"—12.6 EER	0.095

TABLE III.18—POTENTIAL ENERGY SAVINGS ESTIMATES FOR SMALL SINGLE-PHASE SPVHP

Efficiency level	Primary energy savings estimate * (quads)
Level 1—9.5 EER	0.012
Level 2—10 EER	0.026
Level 3—11 EER	0.064
Level 4—12 EER	0.089
Level 5—"Max-Tech"—12.5 EER	0.101

* For SPVHPs, the primary energy savings estimates are based on both cooling savings (EER) and heating savings (COP).

TABLE III.19—POTENTIAL ENERGY SAVINGS ESTIMATES FOR SMALL THREE-PHASE SPVHP

Efficiency level	Primary energy savings estimate* (quads)
Level 1—9.5 EER	0.004
Level 2—10 EER	0.009
Level 3—11 EER	0.025
Level 4—12 EER	0.037
Level 5—"Max-Tech"—12.5 EER	0.042

* For SPVHPs, the primary energy savings estimates are based on both cooling savings (EER) and heating savings (COP).

As mentioned previously, due to the small size of the market for large SPVACs (five models) and a lack of shipment estimates, DOE could not perform a full analysis of energy savings for this product class. However, DOE used the results from small SPVACs to approximate the energy savings for large SPVACs.

DOE notes that analysis of the market shows only a narrow range of efficiencies for large SPVACs, with two out of the five existing models (40 percent) at 10.0 EER and three out of the five models (60 percent) at 9.5 EER. DOE also estimates that the UEC for a typical large SPVAC at a 9.5 or 10.0 EER will be approximately twice that calculated for a small SPVAC at the same efficiency levels, as the equipment capacity of the available large SPVAC products is approximately twice that of the average size for the small SPVAC equipment. While DOE has no data on shipments for large SPVACs, it notes that the number of available models of large SPVACs is approximately 1.4 percent of small SPVACs based on its market analysis.

Assuming relative shipments of large SPVACs to small SPVACs could be characterized by the ratio of models available, and that the per-unit energy savings in going from 9.5 to 10.0 EER (the highest available efficiency) is twice that of the small SPVACs going between these levels, DOE estimates that the potential energy savings for standards set at the market maximum 10.0 EER level is roughly 1.68 percent of the difference in the energy savings calculated for the small SPVAC standards at 10.0 EER and at 9.5 EER (shown in table III.16 and III.17). This would suggest an energy savings potential of approximately 0.0009 quads, shown in Table III.20.[25]

TABLE III.20—POTENTIAL ENERGY SAVINGS ESTIMATES FOR LARGE SPVAC

Efficiency level	Primary energy savings estimate (quads)
Level 1—10.0 EER	0.0009

IV. Public Participation

A. Submission of Comments

DOE will accept comments, data, and information regarding this NODA no later than the date provided in the **DATES** section at the beginning of this notice. Interested parties may submit comments, data, and other information using any of the methods described in the **ADDRESSES** section at the beginning of this notice.

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 Web site will waive any CBI claims for the information submitted. For information on submitting CBI, see the Confidential Business Information section below.

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

Submitting comments via email, hand delivery/courier, or mail. Comments and documents submitted via email, hand delivery, or mail also will be posted to *www.regulations.gov*. If you do not want your personal contact information to be publicly viewable, do not include it in

[25] Estimated as [60 percent of the large SPVAC market being affected at the 10.0 EER standard level times twice the UEC savings of the small SPVAC products in going from 9.5 to 10.0 EER times 1.4 percent of the total shipments, or equal to $0.60 \times 2 \times 0.014 \times [(0.076+0.023) - (.035+.01)]$ quads. DOE did not separate this product class into single-phase and three-phase units because the savings would be even more speculative at this level, and the breakdown is not required.

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. Email submissions are preferred. If you submit via mail or hand delivery/courier, please provide all items on a CD, if feasible, in which case, it is not necessary to submit printed copies. No facsimiles (faxes) will be accepted.

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

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

Confidential business information. Pursuant to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email, postal mail, or hand delivery/courier two well-marked copies: one copy of the document marked "confidential" that includes all the information believed to be confidential, and one copy of the document marked "non-confidential" with the information believed to be confidential deleted. Submit these documents via email or on a CD, if feasible. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

Factors of interest to DOE when evaluating requests to treat submitted information as confidential include: (1) A description of the items; (2) whether and why such items are customarily treated as confidential within the industry; (3) whether the information is generally known by or available from other sources; (4) whether the information has previously been made available to others without obligation concerning its confidentiality; (5) an explanation of the competitive injury to the submitting person which would result from public disclosure; (6) when such information might lose its confidential character due to the passage of time; and (7) why disclosure of the information would be contrary to the public interest.

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).

B. Issues on Which DOE Seeks Comment

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

(1) The impact of proposed addenda h, i, and j to ASHRAE Standard 90.1–2010 on the energy savings presented in today's NODA;

(2) The energy savings potential of small and large evaporatively-cooled commercial package air conditioners;

(3) The market for VRF water-source heat pumps with cooling capacities below 17,000 Btu/h and above 135,000 Btu/h. DOE is seeking data and information that would allow it to accurately characterize the energy savings from amended energy conservation standards for these products;

(4) The market for large and very large SPVACs and SPVHPs;

(5) Approaches for establishing energy conservation standards for covering air conditioners and condensing units serving computer rooms;

(6) Data and information for air conditioners and condensing units serving computer rooms that could be used in performing an energy savings analysis at a future stage of this rulemaking;

(7) Approaches for developing appropriate definitions for "air conditioners and condensing units serving computer rooms" that would not result in overlap between this equipment and the other types of commercial packaged air conditioning and heating equipment covered by EPCA;

(8) The use of AHRI 1230, ASHRAE 127, and AHRI 390 as the test method for VRF equipment, air conditioners and condensing units serving computer rooms, and SPVACs and SPVHPs, respectively; and

(9) DOE's preliminary conclusion that the updates to the most recent versions of AHRI 210/240, AHRI 340/360, UL 727, ANSI Z21.47, and ANSI Z21.10.3 do not have a substantive impact on the measurement of energy efficiency for the associated equipment types for each test procedure;

(10) DOE's analysis of UEC for the water-cooled, evaporatively-cooled, SVPU equipment classes and its use in establishing the energy savings potential for higher standards. Of particular interest are other building applications for SPVU equipment and the value of incorporating these into the analysis of UEC.

(11) DOE's allocation of shipments to the eight classes of water-cooled and evaporatively-cooled equipment for which analysis was performed, as well as the future market and shipment scenarios for these products; and

(12) DOE's determination of the base-case distribution efficiencies and its prediction on how amended energy conservation standards affect the distribution of efficiencies in the standards case for the twelve classes of equipment for which analysis was performed.

V. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this notice of data availability.

Issued in Washington, DC, on April 27, 2011.

Kathleen Hogan,

Deputy Assistant Secretary for Energy Efficiency, Office of Technology Development, Energy Efficiency and Renewable Energy.

[FR Doc. 2011–10877 Filed 5–4–11; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. NM454 Special Conditions No. 25–11–11–SC]

Special Conditions: Gulfstream Model GVI Airplane; Limit Engine Torque Loads for Sudden Engine Stoppage

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed special conditions.

SUMMARY: This action proposes special conditions for the Gulfstream GVI airplane. This airplane will have novel or unusual design features when compared to the state of technology envisioned in the airworthiness standards for transport category airplanes. These design features include