are too small to accommodate a GPS device, that not all losses are transport-related, and that any installed GPS device could likely be removed or disabled.

DOT also stated that, although the U.S. has the right to enact unique security provisions, the impact on international transport must be considered, and the requirements for importers and exporters of radioactive material devices and the consequences for overseas buyers and suppliers of these devices must be analyzed. DOT stated that any actions undertaken by the NRC must consider security related measures being implemented or under evaluation for implementation by Federal agencies, including DOT and the U.S. Department of Homeland Security. DOT also commented that the proposal's ability to reduce both the probability of theft/diversion and the associated impacts of theft/diversion, as well as the advantages and disadvantages of state-specific regulations, in addition to national regulations, need to be evaluated. Specifically, DOT stated that requirements that vary widely from state to state could have significant impacts on interstate commerce.

In addition, DOT stated that, although the petitioner cited that significant law enforcement efforts were undertaken to recover past devices, there is no quantified data provided for these efforts, nor quantification of potential benefits of the proposal, nor quantification of the impacts for a national or state GPS requirement, and stated that a requirement for a specific technology to be implemented, rather than a performance based measure that achieves the same objective, may have adverse impacts. DOT further stated that a risk-informed evaluation should be implemented taking these factors into account to ensure a measured and appropriate final decision on this petition is achieved.

Reasons for Closure of the Petition

The NRC concluded that the underlying issue of tracking shipments of highly radioactive sources is an important one and merits further consideration, and therefore, will be included into NRC's ongoing rulemaking efforts on the security requirements for the transportation of Radioactive Material in Quantities of Concern. This rulemaking will consider various tracking technologies including, but not limited to, GPS technology. Further information on this rulemaking may be tracked through *http://www.regulations.gov* under Docket ID NRC–2008–0120.

While the NRC will consider the issues raised by the petition in the rulemaking process, the petitioner's concerns may not be addressed exactly as the petitioner has requested. During the rulemaking process, the NRC will solicit comments from the public and will consider all comments before finalizing the rule.

Existing NRC regulations provide the basis for reasonable assurance that the common defense and security and public health and safety are adequately protected.

For the reasons cited in this document, the NRC closes this petition.

Dated at Rockville, Maryland, this 1st day of July, 2008.

For the Nuclear Regulatory Commission.

R.W. Borchardt,

Executive Director for Operations.

[FR Doc. E8–16235 Filed 7–15–08; 8:45 am]

BILLING CODE 7590–01–P

DEPARTMENT OF ENERGY

10 CFR Part 431

[Docket No. EERE–2008–BT–STD–0013]

RIN 1904–AB83

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, 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 Standard 90.1–2007) on January 10, 2008, thereby triggering DOE's related obligations under EPCA. 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. Potential energy savings are based upon either the efficiency levels specified in the amended industry standard (*i.e.*, ASHRAE Standard 90.1–2007) 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: (1) Announce the results and preliminary conclusions of DOE's analysis of potential energy savings associated with amended standards for this equipment, and (2) 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 August 15, 2008. 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–2008–BT–STD–0013 and/or Regulatory Information Number (RIN) 1904–AB83. Comments may be submitted using any of the following methods:

- *Federal eRulemaking Portal: http://www.regulations.gov.* Follow the instructions for submitting comments.
- *E-mail: ASHRAE_90.1_rulemaking@ee.doe.gov.* Include the docket number EERE–2008–BT–STD–0013 and/or RIN number 1904–AB83 in the subject line of the message.
- *Postal Mail:* Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, Mailstop EE–2J, 1000 Independence Avenue, SW., Washington, DC 20585–0121. Please submit one signed paper original.
- *Hand Delivery/Courier:* Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, 950 L'Enfant Plaza, SW., Suite 600, Washington, DC 20024. Telephone: (202) 586–2945. Please submit one signed paper original.

For detailed instructions on submitting comments and additional information on this document, see section IV (Public Participation).

Docket: For access to background documents or comments received, visit the U.S. Department of Energy, Resource Room of the Building Technologies

Program, 950 L'Enfant Plaza, SW., Suite 600, Washington, DC 20024, (202) 586–2945, between 9 a.m. and 4 p.m., Monday through Friday, except Federal holidays. Please call Ms. Brenda Edwards at the above telephone number for additional information about visiting the Resource Room.

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.*

Ms. Francine Pinto or Mr. Eric Stas, U.S. Department of Energy, Office of the General Counsel, Mailstop GC–72, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585–0121. Telephone: (202) 586–9507. E-mail: *Francine.Pinto@hq.doe.gov* or *Eric.Stas@hq.doe.gov.*

For information on how to submit 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:

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I. Introduction

A. Authority

Title III of EPCA, Pub. L. 94–163, as amended, sets forth a variety of provisions concerning energy efficiency. Part A–1 [1] of Title III created the energy conservation program for ''Certain Industrial Equipment.'' (42 U.S.C. 6311–6317) In general, this program addresses the energy efficiency of certain types of commercial and industrial equipment. Part A–1 specifically includes 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 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, 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).

In acknowledgement of technological changes that yield energy efficiency benefits, Congress further 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,[2] 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))

[1] This part was originally titled Part C; however, it was redesignated Part A–1 after Part C of Title III of EPCA was repealed by Public Law 109–58.

[2] 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. 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).

As a preliminary step in this process, 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).[3] (42 U.S.C. 6313(a)(6)(A))

On January 9, 2008, ASHRAE's Board of Directors gave final approval to ASHRAE Standard 90.1–2007[4] for distribution, which ASHRAE officially released and made public on January 10, 2008. 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).

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. 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 modified efficiency levels contained within ASHRAE Standard 90.1–2007, 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 90.1–2007 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. However, for other ASHRAE products, DOE found that while ASHRAE had made changes in ASHRAE Standard 90.1–2007, it was not immediately apparent whether such revisions to the Standard 90.1 level would make the equipment more or less efficient, as compared to the existing Federal energy conservation standards. For example, when setting a standard using a different efficiency metric (as is the case for several types of commercial packaged boiler equipment), ASHRAE Standard 90.1–2007 changes the standard level from that specified in EPCA, but it is not immediately clear whether a standard level will make equipment more or less efficient. Therefore, DOE is undertaking this additional threshold analysis in order to thoroughly evaluate the amendments in ASHRAE Standard 90.1–2007 in a manner consistent with its statutory mandate.

Using this approach, DOE has undertaken a comprehensive analysis of the products covered under both EPCA and ASHRAE Standard 90.1–2007 to determine which products types require further analysis. Section II, *Discussion of Equipment for Further Consideration,* contains a description of DOE's evaluation of each ASHRAE equipment type for which energy conservation standards have been set pursuant to EPCA, in order for DOE to determine whether the amendments in Standard 90.1–2007 have resulted in increased efficiency levels. For those types of equipment in ASHRAE Standard 90.1, which have been determined to increase the efficiency levels, DOE subjected that equipment to further analysis under Section III, *Analysis of Potential Energy Savings.*

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). After review of the public comments on this NODA, if DOE decides that the amended efficiency levels in ASHRAE Standard 90.1–2007 have the potential for additional energy savings for types of equipment currently covered by uniform national standards, DOE will commence rulemaking to consider amended standards, based upon either the efficiency levels in ASHRAE Standard 90.1–2007 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[5] (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[6] (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.[7] (42 U.S.C. 6316(a); 42 U.S.C. 6295(o)(4)).

C. Background

ASHRAE Standard 90.1–2007

As noted above, on January 9, 2008, ASHRAE's Board of Directors gave final approval to ASHRAE Standard 90.1–2007, which ASHRAE released on January 10, 2008. The ASHRAE standard addresses efficiency levels for many types of commercial heating,

[3] This statutory provision was added by section 305 of the Energy Independence and Security Act of 2007 (EISA 2007), Public Law 110–140, which applies to all of the products for which there are currently Federal energy conservation standards that are also covered by ASHRAE Standard 90.1. In addition, this document is also required under the Consent Decree (filed Nov. 6, 2006) in *New York* v. *Bodman,* No. 05 Civ. 7807 (S.D.N.Y. filed Sept. 7, 2005) and *Natural Resources Defense Council* v. *Bodman,* No. 05 Civ. 7808 (S.D.N.Y. filed Sept. 7, 2005), which requires an initial DOE action to be taken on any ASHRAE amendments related to products in the Consent Decree (*i.e.,* packaged terminal air conditioners and packaged terminal heat pumps, packaged boilers, and instantaneous water heaters) no later than six months after adoption of the amendment by ASHRAE. (Consent Decree section III, paragraph 4)

[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 sometimes be referred to more formally as ANSI/ASHRAE/IESNA Standard 90.1–2007. *See http://www.ashrae.org* for more information.

[5] 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. *Natural Resources Defence Council* v. *Abraham,* 355 F. 3d 179 (2d Cir. 2004).

[6] 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))

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

ventilating, air-conditioning (HVAC), and water-heating equipment covered by EPCA. ASHRAE Standard 90.1–2007 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 90.1–1999).

Table I.1 below sets forth the existing Federal energy conservation standards and the efficiency levels specified in ASHRAE Standard 90.1–2007 for equipment where ASHRAE modified its requirements. The balance of this section of the document will assess these equipment types to determine whether the amendments in ASHRAE Standard 90.1–2007 constitute increased energy efficiency levels, as would necessitate further analysis of the potential energy savings from amended Federal energy conservation standards under Section III.

TABLE I.1.—FEDERAL ENERGY CONSERVATION STANDARDS AND ENERGY EFFICIENCY LEVELS IN ASHRAE STANDARD 90.1–2007 FOR SPECIFIC TYPES OF COMMERCIAL EQUIPMENT*

ASHRAE equipment class	Federal energy conservation standards	Energy efficiency levels in ASHRAE Standard 90.1–2007	ASHRAE Standard 90.1–2007 effective date	Energy-savings potential analysis required
Commercial Warm-Air Furnaces				
Gas-Fired Commercial Warm-Air furnace	E_t = 80%	E_c = 80% ..... Interrupted or intermittent ignition device, jacket losses not exceeding 0.75% of input rating, power vent, or flue damper**.	1/10/2008	No (See Section II.A.1.).
Oil-Fired Commercial Warm-Air furnace	E_t = 81%	E_t = 81% ..... Interrupted or intermittent ignition device, jacket losses not exceeding 0.75% of input rating, power vent, or flue damper**.	1/10/2008	No (See Section II.A.2.).
Commercial Package Air-Conditioning and Heating Equipment				
Through-the-Wall Air Conditioners	13.0 SEER*** (Effective as of 06/19/08)	12.0 SEER (As of 01/23/10)	1/23/2010	No (See Section II.B.1.).
Through-the-Wall Air-Cooled Heat Pumps	13.0 SEER (Effective as of 06/19/08)	12.0 SEER 7.4 HSPF † (As of 01/23/10)	1/23/2010	No (See Section II.B.1.).
Small Duct, High Velocity, Air-Cooled Air Conditioners.	13.0 SEER (Effective as of 06/19/08)	10.0 SEER	1/10/2008	No (See Section II.B.2.).
Small Duct, High Velocity, Air-Cooled Heat Pumps.	13.0 SEER (Effective as of 06/19/08)	10.0 SEER 6.8 HSPF	1/10/2008	No (See Section II.B.2.).
Packaged Air-Cooled Air Conditioners with Cooling Capacity ≥760,000 Btu/h †† and with No Heating or with Electric Resistance Heating.	None	9.7 EER ††† (As of 01/01/10)	1/1/2010	No (See Section II.B.3.).
Packaged Air-Cooled Air Conditioners with Cooling Capacity ≥760,000 Btu/h and with Heating That is Other Than Electric Resistance Heating.	None	9.5 EER (As of 01/01/10)	1/1/2010	No (See Section II.B.3.).
Water-Cooled and Evaporatively Cooled Air Conditioner with Cooling Capacity ≥135,000 and <240,000 Btu/h, and with No Heating or with Electric Resistance Heating.	11.0 EER	11.0 EER	‡1/10/2008	No (See Section II.B.4.).
Water-Cooled and Evaporatively Cooled Air Conditioner with Cooling Capacity ≥135,000 and <240,000 Btu/h, and with Heating That is Other Than Electric Resistance Heating.	11.0 EER	10.8 EER	‡1/10/2008	No (See Section II.B.4.).
Water-Cooled and Evaporatively Cooled Air Conditioner with Cooling Capacity ≥240,000 Btu/h and with No Heating or with Electric Resistance Heating.	None	11.0 EER	1/10/2008	No (See Section II.B.5.).
Water-Cooled and Evaporatively Cooled Air Conditioner with Cooling Capacity ≥240,000 Btu/h and with Heating That is Other Than Electric Resistance Heating.	None	10.8 EER	1/10/2008	No (See Section II.B.5.)

TABLE I.1.—FEDERAL ENERGY CONSERVATION STANDARDS AND ENERGY EFFICIENCY LEVELS IN ASHRAE STANDARD 90.1–2007 FOR SPECIFIC TYPES OF COMMERCIAL EQUIPMENT*—Continued

ASHRAE equipment class	Federal energy conservation standards	Energy efficiency levels in ASHRAE Standard 90.1–2007	ASHRAE Standard 90.1–2007 effective date	Energy-savings potential analysis required
Packaged Terminal Air Conditioners (PTACs) and Heat Pumps (PTHPs) ‡‡				
Packaged Terminal Air Conditioners with Cooling Capacity <7,000 Btu/h, and Standard Size ‡‡‡ (New Construction).	EER = 8.88	EER = 11.0	‡1/10/2008	No (See Section II.C.).
Packaged Terminal Air Conditioners with Cooling Capacity <7,000 Btu/h, and Non-Standard Size ◊ (Replacement).	EER = 8.88	EER = 9.4	‡1/10/2008	No (See Section II.C.).
Packaged Terminal Air Conditioners with Cooling Capacity ≥7,000 and <15,000 Btu/h, and Standard Size ‡‡‡ (New Construction).	EER = 10.0 − (0.16 × Cap ◊◊).	EER = 12.5 − (0.213 × Cap ◊◊).	‡1/10/2008	No (See Section II.C.).
Packaged Terminal Air Conditioners with Cooling Capacity ≥7,000 and <15,000 Btu/h, and Non-Standard Size◊ (Replacement).	EER = 10.0 − (0.16 × Cap ◊◊).	EER = 10.9 − (0.213 × Cap ◊◊).	‡1/10/2008	No (See Section II.C.).
Packaged Terminal Air Conditioners with Cooling Capacity >15,000 Btu/h, and Standard Size ‡‡‡ (New Construction).	EER = 7.6	EER = 9.3	‡1/10/2008	No (See Section II.C.).
Packaged Terminal Air Conditioners with Cooling Capacity >15,000 Btu/h, and Non-Standard Size ◊ (Replacement).	EER = 7.6	EER = 7.7	‡1/10/2008	No (See Section II.C.).
Packaged Terminal Heat Pumps with Cooling Capacity <7,000 Btu/h, and Standard Size ‡‡‡ (New Construction).	EER = 8.88 COP◊◊◊ = 2.7	EER = 10.8 COP = 3.0	‡1/10/2008	No (See Section II.C.).
Packaged Terminal Heat Pumps with Cooling Capacity <7,000 Btu/h, and Non-Standard Size◊ (Replacement).	EER = 8.88 COP = 2.7	EER = 9.3 COP = 2.7	‡1/10/2008	No (See Section II.C.).
Packaged Terminal Heat Pumps with Cooling Capacity ≥7,000 and <15,000 Btu/h, and Standard Size ‡‡‡ (New Construction).	EER = 10.0 − (0.16 × Cap ◊◊). COP = 1.3 + (0.16 × EER)	EER = 12.3 − (0.213 × Cap ◊◊). COP = 3.2 − (0.026 × Cap ◊◊).	‡1/10/2008	No (See Section II.C.).
Packaged Terminal Heat Pumps with Cooling Capacity ≥7,000 and <15,000 Btu/h, and Non-Standard Size ◊ (Replacement).	EER = 10.0 − (0.16 × Cap ◊◊). COP = 1.3 + (0.16 × EER)	EER = 10.8 − (0.213 × Cap ◊◊). COP = 2.9 − (0.026 × Cap ◊◊).	‡1/10/2008	No (See Section II.C.).
Packaged Terminal Heat Pumps with Cooling Capacity >15,000 Btu/h, and Standard Size ‡‡‡ (New Construction).	EER = 7.6 COP = 2.5	EER = 9.1 COP = 2.8	‡1/10/2008	No (See Section II.C.)
Packaged Terminal Heat Pumps with Cooling Capacity >15,000 Btu/h, and Non-Standard Size ◊ (Replacement).	EER = 7.6 COP = 2.5	EER = 7.6 COP = 2.5	‡1/10/2008	No (See Section II.C.).
Commercial Water Heaters				
Oil-Fired Instantaneous Water Heaters ≥4,000 Btu/h/gal and ≥10 gal.	E_T = 78% SL = Q/800 + 110(V_r)$^{1/2}$, Btu/h.	E_T = 78% SL = Q/800 + 110(V)$^{1/2}$, Btu/h.	‡1/10/2008	No (See Section II.D.1.).
Electric Storage Water Heaters	SL = 0.3 + 27/V_m (%/h)	SL = 20 + 35(V)$^{1/2}$, Btu/h	‡1/10/2008	No (See Section II.D.2.).
Commercial Packaged Boilers				
Small Gas-Fired, Hot Water, Commercial Packaged Boilers.	E_C = 80%	E_T = 80%	3/2/2010	Yes (See Section II.E.1, Section III, and Table III.4.).
Small Gas-Fired, Steam, All Except Natural Draft Commercial Packaged Boilers.	E_C = 80%	E_T = 79%	3/2/2010	Yes (See Section II.E.2, Section III, and Table III.5.).
Small Gas-Fired, Steam, Natural Draft, Commercial Packaged Boilers.	E_C = 80%	E_T = 77% (Effective 03/2/2010). E_T = 79% (Effective 03/2/2020).	3/2/2010 3/2/2020	Yes (See Section II.E.3, Section III, and Table III.6.).

TABLE I.1.—FEDERAL ENERGY CONSERVATION STANDARDS AND ENERGY EFFICIENCY LEVELS IN ASHRAE STANDARD 90.1–2007 FOR SPECIFIC TYPES OF COMMERCIAL EQUIPMENT*—Continued

ASHRAE equipment class	Federal energy conservation standards	Energy efficiency levels in ASHRAE Standard 90.1–2007	ASHRAE Standard 90.1–2007 effective date	Energy-savings potential analysis required
Small Oil-Fired, Hot Water, Commercial Packaged Boilers.	E_C = 83%	E_T = 82%	3/2/2010	Yes (See Section II.E.4, Section III, and Table III.7.).
Small Oil-Fired, Steam, Commercial Packaged Boilers.	E_C = 83%	E_T = 81%	3/2/2010	Yes (See Section II.E.5, Section III, and Table III.8.).
Large Gas-Fired, Hot Water, Commercial Packaged Boilers.	E_C = 80%	E_C = 82%	3/2/2010	Yes (See Section II.E.6, Section III, and Table III.9.).
Large Gas-Fired, Steam, All except Natural Draft, Boilers.	E_C = 80%	E_T = 79%	3/2/2010	Yes (See Section II.E.7, Section III, and Table III.10.).
Large Gas-Fired, Steam, Natural Draft, Commercial Packaged Boilers.	E_C = 80%	E_T = 77% (Effective 3/2/2010). E_T = 79% (Effective 3/2/2020).	3/2/2010 3/2/2020	Yes (See Section II.E.8, Section III, and Table III.11.).
Large Oil-Fired, Hot Water, Commercial Packaged Boilers.	E_C = 83%	E_C = 84%	3/2/2010	Yes (See Section II.E.9, Section III, and Table III.12.).
Large Oil-Fired, Steam, Commercial Packaged Boilers.	E_C = 83%	E_T = 81%	3/2/2010	No (See Section II.E.10.).

* All equipment classes included in this table are equipment where there is a perceived difference between the current Federal standard levels and the efficiency levels specified by ASHRAE Standard 90.1–2007. Although, in some cases, the efficiency levels in this table may appear to be equal or lower than the Federal energy conservation standards, DOE further reviewed the efficiency levels in ASHRAE Standard 90.1–2007 and presented its findings in section II, *Discussion of Equipment for Further Consideration.*

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

*** Seasonal Energy Efficiency Ratio.

† Heating Seasonal Performance Factor.

†† British thermal units per hour (Btu/h).

††† Energy Efficiency Ratio.

‡ For the purposes of this NODA, the date shown in this column is the date of publication of ASHRAE Standard 90.1–2007 (Jan. 10, 2008) for equipment where the ASHRAE Standard 90.1–2007 initially appears to be different from the Federal energy conservation standards and where no effective date was specified by ASHRAE Standard 90.1–2007.

‡‡ 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.

◊ Non-standard size refers to PTAC or PTHP aequipment with wall sleeve dimensions less than 16 inches high and less than 42 inches wide. ASHRAE/IESNA Standard 90.1–1999 also includes a factory labeling requirement for non-standard size PTAC and PTHP equipment as follows: "MANUFACTURED FOR REPLACEMENT APPLICATIONS ONLY; NOT TO BE INSTALLED IN NEW CONSTRUCTION PROJECTS."

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

◊◊◊ Coefficient of Performance.

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 for which ASHRAE Standard 90.1–2007 modified the pre-existing minimum efficiency standard. For each class of commercial equipment for which ASHRAE modified the pre-existing standard, DOE assessed whether the change made would increase energy efficiency and, therefore, require an energy-savings potential analysis. This assessment is summarized in Section II of this NODA. Table I.1 indicates whether DOE concluded, based on this assessment, that an energy-savings potential analysis is required. For those products for which such an analysis is required, DOE has indicated the results of its preliminary analysis in section III.

Based upon DOE's analysis in section II, DOE has determined that ASHRAE increased the efficiency level for the following equipment classes. Accordingly, DOE performed an energy-savings analysis for these equipment types, the results of which are presented in section III. These equipment classes include:

- Small, Gas-Fired Hot Water Commercial Packaged Boilers;
- Small, Gas-Fired, Steam, All Except Natural Draft Commercial Packaged Boilers;
- Small, Gas-Fired, Steam, Natural Draft, Commercial Packaged Boilers;
- Small, Oil-Fired, Hot Water Commercial Packaged Boilers;
- Small, Oil-Fired, Steam, Commercial Packaged Boilers;
- Large, Gas-Fired, Hot Water Commercial Packaged Boilers;
- Large, Gas-Fired, Steam, All Except Natural Draft Commercial Packaged Boilers;
- Large, Gas-Fired, Steam, Natural Draft, Commercial Packaged Boilers;
- Large, Oil-Fired, Hot Water Commercial Packaged Boilers.

II. Discussion of Equipment for Further Consideration

As discussed above, before beginning an analysis of the potential energy savings that would result from adopting the efficiency levels specified by ASHRAE Standard 90.1–2007 or more stringent efficiency levels, DOE first determined whether or not the ASHRAE Standard 90.1–2007 efficiency levels actually represented an increase in efficiency above the current Federal standard levels. This section contains a discussion of each equipment class where the ASHRAE Standard 90.1–2007 efficiency level differs from the current Federal standard level, along with a preliminary conclusion as to the action DOE would take with respect to that equipment.

A. Commercial Warm-Air Furnaces

Under EPCA, 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.'' (42 U.S.C. 6311(11)(A)) 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. The amendments in ASHRAE Standard 90.1–2007 trigger DOE to evaluate two types of furnaces: (1) Gas-fired commercial warm air furnaces, and (2) oil-fired commercial warm air furnaces.

1. Gas-Fired Commercial Warm-Air Furnaces

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 90.1–1999, 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 Part 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.

ASHRAE changed the efficiency levels for gas-fired commercial warm-air furnaces by changing the metric from a thermal efficiency descriptor to a combustion efficiency descriptor and adding three design requirements. Specifically, the efficiency levels in ASHRAE Standard 90.1–2007 specify a minimum combustion efficiency of 80 percent. ASHRAE Standard 90.1–2007 also specifies the following design requirements for commercial gas-fired warm-air furnaces: The gas-fired commercial warm-air furnace must use an interrupted or intermittent ignition device, have jacket losses no greater than 0.75 percent of the input rating, and use a power vent or flue damper.

In order to evaluate the change in efficiency level (if any) effectuated by the amended ASHRAE standard, DOE reviewed the change of metric for gas-fired commercial warm-air furnaces. In general, the energy efficiency of a product is a function of the relationship between the product's output of services and its energy input. A furnace's output is largely the energy content of its output (*i.e.,* warm air delivered to the building). A furnace's energy losses consist of energy that escapes through its flue (commonly referred to as ''flue losses''), and of energy that escapes into the area surrounding the furnace (commonly referred to as ''jacket losses'').

In a final rule published in the **Federal Register** on October 21, 2004 (the October 2004 final rule), DOE incorporated definitions for commercial warm-air furnaces and its efficiency descriptor, energy efficiency test procedures, and energy conservation standards. 69 FR 61916. In the October 2004 final rule, DOE pointed out that EPCA specifies the energy conservation standard levels for commercial warm-air furnaces in terms of thermal efficiency (42 U.S.C. 6313(a)(4)(A)–(B); 10 CFR 431.77), but provides no definition for this term. DOE proposed to interpret this term in the context of commercial warm-air furnaces to mean combustion efficiency (*i.e.,* 100 percent minus percent flue loss). *Id.* at 61919. Given use of the thermal efficiency term in EPCA and its continued use as the efficiency descriptor for furnaces in ANSI Standard Z21.47, *Gas-Fired Central Furnaces* (DOE's test procedure for this equipment), DOE stated that it would be confusing to use the term ''combustion efficiency'' in the final rule. Accordingly, DOE defined the term ''thermal efficiency'' to mean 100 percent minus the percent flue loss in the October 2004 final rule for gas-fired commercial warm-air furnaces. *Id.*

Upon reviewing the efficiency levels and methodology specified in ASHRAE Standard 90.1–2007, DOE believes that despite changing the name of the energy efficiency descriptor from ''thermal efficiency'' to ''combustion efficiency,'' ASHRAE did not intend to change the efficiency metric for gas-fired commercial warm air furnaces. When ASHRAE specified a newer version of the test procedure manufacturers use for gas-fired commercial air furnaces (*i.e.*, ANSI Standard Z21.47–2001), the calculation of thermal efficiency did not change from the previous version. So despite that change in the name of the energy efficiency descriptor, DOE believes that in the present context, the terms are synonymous, because the calculation of that value has not changed (*i.e.* , 100 percent minus the percent flue loss). DOE sees no plausible reason why ASHRAE would have chosen to incorporate a different metric than that used in the ANSI Standard Z21.47–2001 test procedure. Consequently, because the amendments for this type of product set out in ASHRAE Standard 90.1–2007 do not appear to have changed the efficiency level, DOE tentatively plans to leave 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'' established by DOE in the October 2004 final rule and presented in subpart D to 10 CFR part 431.

2. Oil-Fired Commercial Warm-Air Furnaces

The Federal minimum energy conservation standard for commercial oil-fired warm-air furnaces corresponds to the efficiency level in ASHRAE Standard 90.1–1999, which specifies that 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 81 percent. 10 CFR 431.77(b). The Federal minimum energy conservation standard for oil-fired commercial warm-air furnaces applies to equipment manufactured on or after January 1, 1994. 10 CFR 431.77.

The efficiency level in ASHRAE Standard 90.1–2007 specifies a minimum thermal efficiency of 81 percent. ASHRAE did not change the efficiency levels for oil-fired commercial warm-air furnaces, but ASHRAE added three design requirements. ASHRAE Standard 90.1–2007 now specifies that commercial, oil-fired, warm-air furnaces must use an interrupted or intermittent ignition device, have jacket losses no greater than 0.75 percent of the input rating, and use a power vent or flue damper.

DOE published a final rule in the **Federal Register** on March 7, 2007, which states that the statutory trigger that requires DOE to adopt uniform national standards based on ASHRAE action is for ASHRAE to change a

standard by increasing the energy efficiency of the equipment listed in EPCA section 342(a)(6)(A)(i) (42 U.S.C. 6313 (a)(6)(A)(i)). 72 FR 10038, 10042. If ASHRAE merely considers raising the standards for any of the equipment listed in this section but ultimately decides to leave the standard levels unchanged or lowers the standard, DOE does not have the authority to conduct a rulemaking for higher standards. *Id.* If ASHRAE imposes more stringent standards for a specific subset of the listed equipment, DOE only has the authority to adopt the ASHRAE levels for that subset of equipment and its effective dates specified in the new ASHRAE standard. *Id.*

In practice, 42 U.S.C. 6313 generally allows ASHRAE Standard 90.1 to set minimum energy efficiency levels for equipment as a model building code and directs DOE to use these efficiency levels as the basis for maintaining consistent, uniform national energy conservation standards for the same equipment, provided all other applicable statutory requirements are met. If ASHRAE has not changed an efficiency level for a class of equipment subject to 42 U.S.C. 6313, DOE does not have authority to consider amending the uniform national standard at the time of publication of the amended ASHRAE Standard 90.1. Therefore, although ASHRAE added design requirements in ASHRAE Standard 90.1–2007, it did not change the efficiency levels for oil-fired commercial warm-air furnaces. Therefore, DOE does not have authority to amend the uniform national standard for this equipment. As stated in the March 2007 final rule, DOE believes that the statutory language specifically links ASHRAE's action in changing standards for specific equipment as a prerequisite to DOE's action for that same equipment. 72 FR 10038, 10042 (March 7, 2007).

B. Commercial Package Air-Conditioning and Heating Equipment

EPCA, as amended, includes the following definition of ''commercial package air-conditioning and heating equipment'': ''air-cooled, water-cooled, evaporatively-cooled, or water source (not including ground water source) electrically operated, unitary central air conditioners and central air-conditioning heat pumps for commercial application.'' (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 ''commercial package air-conditioning and heating equipment that is 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 ''commercial package air-conditioning and heating equipment that is 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 ''commercial package air-conditioning and heating equipment that is 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. Three-Phase, Through-the-Wall Air-Cooled Air Conditioners and Heat Pumps

ASHRAE Standard 90.1–2007 identifies efficiency levels for three-phase through-the-wall air-cooled air conditioners and heat pumps, single package and split systems, with a cooling capacity of no greater than 30,000 Btu/h. The efficiency levels specified by ASHRAE Standard 90.1–2007 include a seasonal energy efficiency ratio of 12.0 for cooling mode and a heating seasonal performance factor of 7.4 for equipment manufactured on or after January 23, 2010.[8] ASHRAE aligned these efficiency levels and its corresponding effective dates with the efficiency levels established in EPCA for single-phase residential versions of the same products.

Neither EPCA nor DOE has established a specific definition for commercial ''through-the-wall air-cooled air conditioners and heat pumps.'' The residential through-the-wall air-cooled air conditioners and heat pumps covered under EPCA, as amended by the National Appliance Energy Conservation Act of 1987 (NAECA) (Pub. L. 100–12) and defined in 10 CFR 430.2, are by definition single-phase products, whereas the commercial through-the-wall air-cooled air conditioners and heat pumps mentioned in ASHRAE Standard 90.1–2007 are three-phase products. In its regulations, DOE defines a residential ''through-the-wall air conditioner and heat pump'' as ''a central air conditioner or heat pump that is designed to be installed totally or partially within a fixed-size opening in an exterior wall. * * *'' 10 CFR 430.2. Furthermore, this equipment: (1) Must be manufactured before January 23, 2010; (2) must not be weatherized; (3) must be clearly and permanently marked for installation only through an exterior wall; (4) have a rated cooling capacity no greater than 30,000 Btu/h; (5) exchange all of its outdoor air across a single surface of the equipment cabinet; and (6) have a combined outdoor air exchange area of less than 800 square inches (split systems) or less than 1,210 square inches (single packaged systems) as measured on the surface described in paragraph (5) of this definition. *Id.*

In terms of equipment construction, commercial and residential through-the-wall air-cooled air conditioners and heat pumps are believed to utilize the same components in the same configurations to provide space cooling and heating. DOE believes commercial versions of through-the-wall air-cooled air conditioners and heat pumps are essentially the same as residential versions, except that they are powered using three-phase electric power.

EPCA does not separate three-phase, through-the-wall air-cooled air conditioners and heat pumps from other types of small commercial package air-conditioning and heating equipment in its definitions. Therefore, EPCA's definition of ''small commercial package air-conditioning and heating equipment'' would include three-phase through-the-wall air-cooled air conditioners and heat pumps. Although EPCA does not use the term ''three-phase through-the-wall air-cooled air conditioners and heat pumps,'' the three-phase versions of this equipment, regardless of cooling capacity, fall within the definition of ''small commercial package air-conditioning and heating equipment.'' (42 U.S.C. 6311(8)(A)-(B)) There is no language in EPCA to indicate that three-phase through-the-wall air-cooled air conditioners and heat pumps are a separate type of covered equipment.

The Federal energy conservation standards for three-phase, commercial package air conditioners and heat pumps less than 65,000 Btu/h were established by EISA 2007 for such products manufactured on or after June 19, 2008. Specifically, section 314(b)(4)(C) of EISA 2007 amended section 342(a) of EPCA (42 U.S.C. 6313(a)) by adding new provisions for three-phase commercial package air conditioners with a cooling capacity of less than 65,000 Btu/h. (42 U.S.C.

[8] ASHRAE provides the same requirement for single-phase and three-phase through-the-wall air-cooled air conditioners and heat pumps used in covered commercial buildings, but points out that single-phase products are regulated as residential products under 10 CFR 430.32(c)(2).

6313(a)(7)(D)) The provision in EISA 2007 mandates minimum seasonal energy efficiency ratios for cooling mode and minimum heating seasonal performance factors for heating mode of air-cooled, three-phase electric central air conditioners and central air-conditioning heat pumps with a cooling capacity of less than 65,000 Btu/h.[9] Three-phase, through-the-wall, air-cooled air conditioners and heat pumps are a smaller subset of three-phase commercial package air conditioners with a cooling capacity of less than 65,000 Btu/h and were not explicitly excluded from the standards in section 314(b)(4)(C) of EISA 2007. Because EISA 2007 set such standards, DOE must follow them, and they are more stringent than the levels contained in ASHRAE Standard 90.1–2007 for those products. Accordingly, DOE affirms that the EISA 2007 efficiency levels for small commercial package air-conditioning and heating equipment less than 65,000 Btu/h apply to three-phase through-the-wall air-cooled air conditioners and heat pumps with a cooling capacity no greater than 30,000 Btu/h. (42 U.S.C. 6313(a)(7)(D)) Therefore, no further analysis is required for three-phase, through-the-wall, air-cooled air conditioners and heat pumps.

2. Three-Phase, Small-Duct, High-Velocity Air-Cooled Air Conditioners and Heat Pumps

ASHRAE Standard 90.1–2007 identifies efficiency levels for three-phase small-duct, high-velocity (SDHV) air-cooled air conditioners and heat pumps, both single-package and split systems, with a cooling capacity less than 65,000 Btu/h.[10] The efficiency levels specified by ASHRAE Standard 90.1–2007 include a seasonal energy efficiency ratio of 10.0 for cooling mode and a heating seasonal performance factor of 6.8 for equipment. ASHRAE aligned these efficiency levels and the corresponding effective dates with the efficiency levels established in EPCA for single-phase residential versions of the same products.

Just as with three-phase, through-the-wall air-cooled air conditioners and heat pumps, neither EPCA nor DOE has established a specific definition for commercial ''three-phase SDHV air conditioners and heat pumps.'' In its regulations, DOE defines a residential small-duct, high-velocity (SDHV) air-cooled air conditioner or heat pump as ''a heating and cooling product that contains a blower and indoor coil combination that: (1) Is designed for, and produces, at least 1.2 inches of external static pressure when operated at the certified air volume rate of 220–350 CFM [cubic feet per minute] per rated ton of cooling; and (2) When applied in the field, uses high velocity room outlets generally greater than 1,000 fpm [feet per minute] which have less than 6.0 square inches of free area.'' 10 CFR 430.2.

In terms of equipment construction, commercial and residential SDHV air conditioners and heat pumps are believed to utilize the same components in the same configurations to provide space cooling and heating. DOE believes commercial versions of SDHV systems are essentially the same as residential versions, except that they are powered using three-phase electric power.

EPCA does not separate three-phase, SDHV air conditioners and heat pumps from other types of small commercial package air-conditioning and heating equipment in its definitions. Therefore, EPCA's definition of ''small commercial package air-conditioning and heating equipment'' would include three-phase SDHV air conditioners and heat pumps. Although EPCA does not use the term ''three-phase SDHV air conditioners and heat pumps,'' the three-phase versions of this equipment, regardless of cooling capacity, fall within the definition of ''small commercial package air-conditioning and heating equipment.'' (42 U.S.C. 6311(8)(A)–(B)) There is no language in EPCA to indicate that three-phase SDHV air conditioners and heat pumps are a separate type of covered equipment.

The Federal energy conservation standards for three-phase, commercial package air conditioners and heat pumps less than 65,000 Btu/h were established by EISA 2007 for products manufactured on or after June 19, 2008. Specifically, section 314(b)(4)(C) of EISA 2007 amended section 342(a) of EPCA (42 U.S.C. 6313(a)) by adding new provisions for three-phase commercial package air conditioners with a cooling capacity of less than 65,000 Btu/h. (42 U.S.C. 6313(a)(7)(D)) As mentioned previously, the provision in EISA 2007 mandates minimum seasonal energy efficiency ratios for cooling mode and minimum heating seasonal performance factors for heating mode of air-cooled, three-phase electric central air conditioners and central air-conditioning heat pumps with a cooling capacity of less than 65,000 Btu/h. (42 U.S.C. 6313(a)(7)(D)) Three-phase, SDHV air conditioners and heat pumps are a smaller subset of three-phase commercial package air conditioners with a cooling capacity of less than 65,000 Btu/h and were not explicitly excluded from the standards in section 314(b)(4)(C) of EISA 2007. Because EISA 2007 set such standards, DOE must follow them, and they are more stringent than the levels contained in ASHRAE Standard 90.1–2007 for those products.

Additionally, the residential versions of SDHV are subject to an exception issued by the Office of Heating and Appeals (OHA). On October 14, 2004, OHA granted an exception to SpacePak and Unico, Inc., authorizing them to manufacture SDHV systems (as defined in 10 CFR 430.2) with a SEER of no less than 11.0 and an HSPF of 6.8. The exception relief will remain in effect until the agency modifies the general energy efficiency standard for central air conditioners and establishes a different standard for SDHV systems that complies with EPCA.[11] However, this exception only applies to the residential, single-phase SDHV systems and would, therefore, exclude three-phase SDHV equipment.

Thus, manufacturers of three-phase SDHV equipment must follow the energy conservation standards in EISA 2007. Accordingly, DOE affirms that the EISA 2007 efficiency levels for three-phase small commercial package air-conditioning and heating equipment less than 65,000 Btu/h apply to three-phase SDHV air-cooled air conditioners and heat pumps with a cooling capacity

[9] Section 314(b)(4)(C) of EISA specifies for ''equipment manufactured on or after the later of January 1, 2008, or the date that is 180 days after the date of enactment of the Energy Independence and Security Act of 2007—

(i) The minimum seasonal energy efficiency ratio of air-cooled 3-phase electric central air conditioners and central air-conditioning heat pumps less than 65,000 Btu per hour (cooling capacity), split systems, shall be 13.0;

(ii) the minimum seasonal energy efficiency ratio of air-cooled 3-phase electric central air conditioners and central air-conditioning heat pumps less than 65,000 Btu per hour (cooling capacity), single package, shall be 13.0;

(iii) the minimum heating seasonal performance factor of air-cooled 3-phase electric central air-conditioning heat pumps less than 65,000 Btu per hour (cooling capacity), split systems, shall be 7.7; and

(iv) the minimum heating seasonal performance factor of air-cooled 3-phase electric central air-conditioning heat pumps less than 65,000 Btu per hour (cooling capacity), single package, shall be 7.7.'' (42 U.S.C. 6313(a)(7)(D))

[10] ASHRAE Standard 90.1–2007 includes efficiency levels for three-phase and single-phase SDHV air-cooled air conditioners and heat pumps used in commercial buildings. ASHRAE Standard 90.1–2007 also includes a footnote to these provisions, which indicates that the single-phase versions of this equipment are regulated as residential products under 10 CFR 430.32(c)(2).

[11] DOE's Office of Hearing and Appeals. *Decision and Order: Applications for Exception.* October 14, 2004. *http://www.oha.doe.gov/cases/ee/tee0010.pdf.*

less than 65,000 Btu/h. Therefore, no further analysis is required for the three-phase SDHV air-cooled air conditioners and heat pumps.

3. Commercial Package Air-Cooled Air Conditioners With a Cooling Capacity at or Above 760,000 Btu per Hour

EPCA specifies energy conservation standards for small (cooling capacities at or above 65,000 and less than 135,000 Btu/h), large (cooling capacities at or above 135,000 and less than 240,000 Btu/h), and very large (cooling capacities at or above 240,000 and less than 760,000 Btu/h) commercial package air-cooled air conditioners. (42 U.S.C. 6313(a)(1)–(2), (7)–(9); 10 CFR Part 431.97) However, there are no Federal energy conservation standards for commercial package air-cooled air conditioners with a cooling capacity at or above 760,000 Btu/h. In contrast, ASHRAE Standard 90.1–2007 sets the minimum energy efficiency levels for this equipment at 9.7 EER for equipment with electric resistance heating, and 9.5 EER for equipment with any other type of heating or without heating. The efficiency level in ASHRAE Standard 90.1–2007 applies to equipment manufactured on or after January 1, 2010.

Thus, units with capacities at or above 760,000 Btu/h fall outside the definitions of the small, large, and very large commercial package air-cooled air conditioner equipment classes established in EPCA. (42 U.S.C. 6311(8)(A)–(D); 10 CFR Part 431.92) Therefore, DOE has tentatively concluded that it does not have the authority to review the efficiency level for that equipment.

4. Water-Cooled and Evaporatively-Cooled Commercial Package Air Conditioners and Heat Pumps With a Cooling Capacity at or Above 135,000 Btu per Hour and Less Than 240,000 Btu per Hour

The current Federal energy conservation standard for water-cooled and evaporatively-cooled commercial package air conditioners and heat pumps with a cooling capacity at or above 135,000 Btu/h and less than 240,000 Btu/h requires an EER no less than 11.0 for equipment manufactured on or after October 29, 2004. 10 CFR 431.97, Table 1.

ASHRAE Standard 90.1–2007 includes the same efficiency level for water-cooled and evaporatively-cooled commercial package air conditioners and heat pumps with a cooling capacity at or above 135,000 Btu/h and less than 240,000 Btu/h that use electric resistance heating (*i.e.*, an EER no less than 11.0). However, ASHRAE Standard 90.1–2007 specifies a different efficiency level for water-cooled and evaporatively-cooled commercial package air conditioners and heat pumps with a cooling capacity at or above 135,000 Btu/h and less than 240,000 Btu/h that use any type of heating other than electric resistance (*i.e.*, an EER no less than 10.8).

DOE reviewed the January 2001 final rule and ASHRAE Standard 90.1–1999 to determine the efficiency levels applicable to water-cooled and evaporatively-cooled commercial package air conditioners and heat pumps with a cooling capacity at or above 135,000 Btu/h and less than 240,000 Btu/h. The January 2001 final rule did not establish different efficiency levels for different types of supplemental heating systems associated with this equipment. All large water-cooled and evaporatively-cooled commercial package air conditioners and heat pumps were subject to the same minimum efficiency level of 11.0 EER regardless of heating type. ASHRAE Standard 90.l–1999 did establish different efficiency levels applicable to water-cooled and evaporatively-cooled commercial package air conditioners and heat pumps with a cooling capacity at or above 135,000 Btu/h and less than 240,000 Btu/h for different types of supplemental heating systems.

DOE has tentatively concluded that the ASHRAE Standard 90.1–2007 efficiency levels for water-cooled and evaporatively cooled commercial package air conditioners and heat pumps with a cooling capacity at or above 135,000 Btu/h and less than 240,000 Btu/h that utilize any type of heating other than electric resistance would have the effect of lowering the minimum efficiency levels (*i.e.*, EER) required by EPCA and allow increased energy consumption. Because of backsliding concerns, DOE has tentatively decided not to adopt the ASHRAE Standard 90.1–2007 efficiency levels for water-cooled and evaporatively cooled commercial package air conditioners and heat pumps with a cooling capacity at or above 135,000 Btu/h and less than 240,000 Btu/h that utilize any type of heating other than electric resistance. Therefore, further analysis is not required.

5. Water-Cooled and Evaporatively-Cooled Commercial Package Air Conditioners and Heat Pumps With a Cooling Capacity at or Above 240,000 Btu per Hour

EPCA defines ''commercial package air-conditioning and heating equipment'' as ''air-cooled, water-cooled, evaporatively-cooled, or water source (not including ground water source) electrically operated, unitary central air conditioners and central air-conditioning heat pumps for commercial application.'' (42 U.S.C. 6311(8)(A); 10 CFR 431.92) EPCA goes on to define ''very large commercial package air-conditioning and heating equipment'' as commercial package air-conditioning and heating equipment that is rated at or above 240,000 Btu per hour and below 760,000 Btu per hour (cooling capacity). (42 U.S.C. 6311(8)(D); 10 CFR 431.92) Although water-cooled and evaporatively-cooled commercial package air conditioners and heat pumps with a cooling capacity at or above 240,000 Btu/h and less than 760,000 Btu/h fall within the definition of very large commercial package air-conditioning and heating equipment, EPCA does not specify Federal energy conservation standards for this equipment class. (EPCA set standards for air-cooled systems only, under 42 U.S.C. 6313(a)(7)–(9).) ASHRAE added this new equipment class to ASHRAE Standard 90.1–2007, setting minimum efficiency levels at 11.0 EER for equipment with electric resistance heating, and at 10.8 EER for equipment with all other types of heating or without heating. Under EPCA, DOE must either adopt the efficiency level specified in ASHRAE Standard 90.1–2007 for this new class of equipment, or consider a more stringent level that would result in significant additional energy savings and is technologically feasible and economically justified. (42 U.S.C. 6313(a)(6))

DOE reviewed the market for water-cooled and evaporatively-cooled commercial package air conditioners and heat pumps and found that manufacturers offer few models. Furthermore, DOE surveyed the Air-conditioning, Heating, and Refrigerating Institute (AHRI) Directory of Certified Product Performance and did not identify any equipment on the market with a cooling capacity at or above 240,000 Btu/h. Because there is currently no equipment in this class being manufactured, there are no energy savings associated with this class at this time; therefore, it is not possible to assess the potential for *additional* energy savings beyond the levels

anticipated in ASHRAE Standard 90.1–2007. Thus, DOE did not perform a potential energy-savings analysis on this equipment type. DOE seeks comments from interested parties on the market and energy savings potential for this equipment type. This is Issue 1 under ''Issues on Which DOE Seeks Comment'' in section IV.B of this NODA.

C. 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.

The current energy conservation standards in EPCA for PTACs and PTHPs apply to all equipment manufactured on or after January 1, 1994 (42 U.S.C. 6313(a)(3)), and correspond to the minimum efficiency levels in ASHRAE/IESNA Standard 90.1–1989. ASHRAE specified more stringent efficiency levels for PTACs and PTHPs in ASHRAE Standard 90.1–2007, corresponding to the efficiency levels in ASHRAE Standard 90.1–1999. The efficiency levels vary by equipment type (*i.e.*, air conditioner or heat pump), wall sleeve dimensions (*i.e.*, new construction and replacement), and cooling capacity.

In response to the efficiency levels in ASHRAE Standard 90.1–1999, the March 2007 final rule states that DOE has decided to explore more stringent efficiency levels than in ASHRAE/IESNA Standard 90.1–1999 for PTACs and PTHPs through a separate rulemaking. 72 FR 10038, 10045 (March 7, 2007). Recently, DOE published a notice of proposed rulemaking (NOPR) proposing more stringent standards than the efficiency levels in ASHRAE Standard 90.1–2007 for all types of PTACs and PTHPs. 73 FR 18858 (April 7, 2008). Since DOE is evaluating standard levels for packaged terminal air conditioners and heat pumps in a separate rulemaking,[12] DOE is excluding PTACs and PTHPs from further consideration, and interested parties can review the energy savings potential of more stringent efficiency levels in the April 2008 NOPR.

D. Commercial Water Heaters

1. Oil-Fired Instantaneous Water Heaters

EPCA defines an ''instantaneous water heater'' as ''a water heater that has an input rating of at least 4,000 Btu per hour per gallon of stored water.'' (42 U.S.C. 6311(12)(B)) DOE incorporated a more specific definition of instantaneous water heater into 10 CFR 431.105, which specifies that an oil-fired instantaneous water heater has an input rating no less than 4,000 Btu/h per gallon of stored water, and that it is industrial equipment (including equipment that heats water to 180 °F or higher).

The Federal energy conservation standard for oil-fired instantaneous water heaters is a minimum thermal efficiency of 78 percent and a maximum standby loss of $Q/800 + 110(V_r)^{1/2}$, where Q is the nameplate input rating in Btu/h and V_r is the rated volume in gallons. 10 CFR 431.110. ASHRAE Standard 90.1–2007 did not change this minimum thermal efficiency requirement. ASHRAE Standard 90.1–2007 contains an efficiency-level specification for the maximum standby loss, which is $Q/800 + 110(V)^{1/2}$, where Q is the nameplate input rating in Btu/h and V is the rated volume in gallons. Since V_r and V are both defined as rated volume in gallons, DOE has determined there is no difference between the standby provisions for the Federal energy conservation standard and the requirements specified by ASHRAE Standard 90.1–2007. Therefore, further analysis is not required.

2. Electric Storage Water Heaters

EPCA defines a ''storage water heater'' as equipment that ''heats and stores water within the appliance at a thermostatically controlled temperature for delivery on demand. Such term does not include units with an input rating of 4,000 Btu/hr or more per gallon of stored water.'' (42 U.S.C. 6311(12)(A); 10 CFR 431.102) Electric storage water heaters are storage water heaters that heat water using electric resistance heating elements.

The Federal energy conservation standard for electric storage water heaters is set under EPCA as ''the maximum standby loss, in percent per hour, of electric storage water heaters shall be 0.30 + (27/Measured Storage Volume [in gallons]).'' (42 U.S.C. 6313(a)(5)(A); 10 CFR 431.110) ASHRAE Standard 90.1–2007 (which remains unchanged from Standard 90.1–1999) specifies a maximum standby loss in Btu per hour, of $20 + (35\sqrt{V})$, where V is the rated volume of the tank in gallons.

As discussed in the January 2001 final rule, DOE determined that the efficiency level in ASHRAE Standard 90.1–1999 (which is the same as the efficiency level specified by ASHRAE Standard 90.1–2007) would increase energy consumption relative to the standard in EPCA. 66 FR 3336, 3350 (Jan. 12, 2001). DOE further stated that under these circumstances, DOE cannot adopt the new efficiency level, because EPCA stipulates that its standards cannot be relaxed. *Id.* Therefore, DOE did not adopt the requirement specified by ASHRAE Standard 90.1–1999 for electric storage water heaters, thereby leaving the existing EPCA standards in place.

Since ASHRAE incorporated exactly the same efficiency levels in ASHRAE Standard 90.1–2007 as it did in ASHRAE Standard 90.1–1999, DOE does not see why its conclusion would differ from the one it presented in the January 2001 final rule. Under these circumstances, DOE has tentatively concluded that it cannot adopt the amended efficiency level for electric storage water heaters. Therefore, no further analysis is necessary.

E. Commercial Packaged Boilers

EPCA defines a ''packaged boiler'' as ''a boiler that is shipped complete with heating equipment, mechanical draft equipment, and automatic controls; usually shipped in one or more sections.'' (42 U.S.C. 6311(11)(B)). In its regulations at 10 CFR 431.102, DOE further refined the ''packaged boiler'' definition to not include a boiler that is custom designed and field constructed; additionally, if the boiler is shipped in more than one section, the sections may be produced by more than one manufacturer, and may be originated or shipped at different times and from more than one location. There are various different types of commercial packaged boilers, which can be distinguished based on the input capacity size (*i.e.*, small or large), fuel type (*i.e.*, oil or gas), output (*i.e.*, hot water or steam), and draft type (*i.e.*, natural draft or other).

[12] For more information about the Packaged Terminal Air Conditioners and Heat Pumps rulemaking, visit the DOE Web site at: *http://www.eere.energy.gov/buildings/appliance_standards/commercial/packaged_ac_hp.html.*

The Federal energy conservation standards separate commercial packaged boilers only by the type of fuel used by the boiler, creating two equipment classes: (1) gas-fired, and (2) oil-fired. (42 U.S.C. 6313(a)(4)(C)–(D); 10 CFR 431.87). ASHRAE Standard 90.1–2007 further divided these two equipment classes into the following ten classes:

- Small, gas-fired, hot water boilers;
- Small, gas-fired, steam, all except natural draft;
- Small, gas-fired, steam, natural draft boilers;
- Small, oil-fired, hot water boilers;
- Small, oil-fired, steam boilers;
- Large, gas-fired, hot water boilers;
- Large, gas-fired, steam, all except natural draft boilers;
- Large, gas-fired, steam, natural draft boilers;
- Large, oil-fired, hot water boilers; and
- Large, oil-fired, steam boilers.

EPCA specified minimum Federal standards for commercial packaged boilers manufactured on or after January 1, 1994. (42 U.S.C. 6313(a)(4)(C)–(D); 10 CFR 431.87). The minimum combustion efficiency at the maximum rated capacity of a gas-fired packaged boiler with capacity of 300,000 Btu/h (300 kBtu/h) or more shall be 80 percent. (42 U.S.C. 6313(a)(4)(C); 10 CFR 431.87(a)) The minimum combustion efficiency at the maximum rated capacity of an oil-fired packaged boiler with capacity of 300,000 Btu/h or more shall be 83 percent. (42 U.S.C. 6313(a)(4)(D); 10 CFR 431.87(b))

Table II.1 shows the ten equipment classes and efficiency levels established by ASHRAE.

TABLE II.1.—ASHRAE STANDARD 90.1–2007 ENERGY EFFICIENCY LEVELS FOR COMMERCIAL PACKAGED BOILERS

Equipment type	Size category (Input kBtu/h)	ASHRAE standard 90.1–2007 (effective 3/2/2010)* (percent)	ASHRAE standard 90.1–2007 (effective 3/2/2020)* (percent)
Small, Gas, Hot Water	300–2,500	E_T = 80.0	E_T = 80.0.
Small, Gas, Steam, All Except Natural Draft	300–2,500	E_T = 79.0	E_T = 79.0.
Small, Gas, Steam, Natural Draft	300–2,500	E_T = 77.0	E_T = 79.0.
Small, Oil, Hot Water	300–2,500	E_T = 82.0	E_T = 82.0.
Small, Oil, Steam	300–2,500	E_T = 81.0	E_T = 81.0.
Large, Gas, Hot Water	>2,500	E_C = 82.0	E_C = 82.0.
Large, Gas, Steam, All Except Natural Draft	>2,500	E_T = 79.0	E_T = 79.0.
Large, Gas, Steam, Natural Draft	>2,500	E_T = 77.0	E_T = 79.0.
Large, Oil, Hot Water	>2,500	E_C = 84.0	E_C = 84.0.
Large, Oil, Steam	>2,500	E_T = 81.0	E_T = 81.0.

* E_C, combustion efficiency; E_T, thermal efficiency.

ASHRAE changed the metric for determining energy efficiency for five equipment classes of small commercial packaged boilers and three equipment classes of large commercial packaged boilers in ASHRAE Standard 90.1–2007. The Federal energy conservation standards for these eight equipment classes are expressed in terms of combustion efficiency, whereas the efficiency levels in ASHRAE Standard 90.1–2007 are expressed in terms of thermal efficiency.

The combustion efficiency descriptor used in EPCA for commercial packaged boilers differs from the thermal efficiency descriptor used in Standard 90.1–2007.[13] In general, the energy efficiency of a product is a function of the relationship between the product's output of services and its energy input. A boiler's output of services is measured largely by the energy content of its output (steam or hot water). Consequently, its efficiency is often viewed as the ratio between its energy output and energy input, with the energy output being calculated as the energy input minus the energy lost in producing the output. A boiler's energy losses consist of energy that escapes through its flue (commonly referred to as ''flue losses''), and of energy that escapes into the area surrounding the boiler (commonly referred to as ''jacket losses''). The combustion efficiency descriptor described in EPCA only accounts for flue losses and typically is defined as ''100 percent minus percent flue loss.'' (42 U.S.C. 6313(4)(C)–(D)) The thermal efficiency descriptor, as used in Standard 90.1–2007, accounts for jacket losses as well as flue losses, so it can be considered combustion efficiency minus jacket loss. Because all boilers will have at least some jacket losses (even if small) and because thermal efficiency takes these losses into account, the thermal efficiency for a particular boiler will always be lower than its combustion efficiency.

There is no direct mathematical correlation between these two measures of efficiency. The factors that contribute to jacket loss (*e.g.* , the boiler's design and materials) have little or no direct bearing on combustion efficiency. The lack of correlation between combustion efficiency and thermal efficiency presents some difficulties in determining how an energy conservation standard based on thermal efficiency, rather than combustion efficiency, would affect the energy consumption of commercial packaged boilers.

EPCA provides that DOE may not prescribe any amended standard that increases the maximum allowable energy use, or decreases the minimum required energy efficiency of a product covered product. (42 U.S.C. 6316(a); 42 U.S.C. 6295(o)(1)) Therefore, in evaluating whether to adopt the thermal efficiency levels in ASHRAE Standard 90.1–2007 for these eight equipment classes, DOE needed to determine whether or not they decrease the efficiency levels of the combustion efficiencies that EPCA currently requires.

DOE used the same methodology established in the March 2006 Notice of Availability and the March 2007 final rule for investigating the metric change for these eight equipment classes. 71 FR 12634, 12639–40 (March 13, 2006); 72 FR 10038, 10043 (March 7, 2007). If the numeric value for the minimum thermal efficiency (expressed as a percentage) were at or above the value for the combustion efficiency (expressed as a percentage), then clearly the ASHRAE Standard 90.1–2007 efficiency levels

[13] The combustion efficiency descriptor and the thermal efficiency descriptor are defined differently for commercial warm air furnaces and commercial packaged boilers. The thermal efficiency descriptor as it applies to commercial warm air furnaces is defined in Subpart D of 10 CFR part 430 as ''one minus flue losses,'' which corresponds to the combustion efficiency descriptor for commercial packaged boilers.

would not be lower than the EPCA energy conservation standard levels. If ASHRAE Standard 90.1–2007's thermal efficiency levels for each product class of commercial boilers were only slightly lower numerically than EPCA's combustion efficiency standards for such equipment, the Standard 90.1–2007 efficiency levels also probably would not represent a reduction in stringency of the minimum efficiency levels (although this would need to be confirmed). However, because the ASHRAE Standard 90.1–2007 thermal efficiency levels for some product classes of commercial packaged boilers have more than a small percentage point difference as compared to EPCA's combustion efficiency levels, DOE must carefully assess whether the Standard 90.1–2007 levels would represent a reduction of existing standards.

To this end, DOE reviewed the AHRI's Institute of Boiler and Radiation Manufacturers (I=B=R) ratings directories for 2008.[14] The I=B=R directory provides efficiency ratings for most of the commercial packaged boilers for sale in the United States. DOE specifically reviewed boilers that fell into each of the eight equipment classes for which a metric change occurred. For each equipment class analyzed, DOE identified the average combustion and thermal efficiencies. DOE also identified the average thermal efficiency for those boilers DOE considers minimally compliant (*i.e.*, those boilers with a combustion efficiency equal to the Federal energy conservation standards).

For approximately 81 percent of the boilers DOE examined, the directory provided both the thermal efficiency and combustion efficiency levels. For 8.5 percent of these boilers, the ratings appear to be erroneous because the directory lists a thermal efficiency rating greater than its combustion efficiency rating, which is physically impossible.[15] As explained above, thermal efficiency includes the effects of jacket losses, whereas combustion efficiency does not. Excluding these boilers, DOE reviewed the thermal and combustion efficiency ratings for the remaining 74.3 percent of the boilers, where both types of efficiency ratings are listed in the 2008 I=B=R directory. DOE presents its review of the efficiency levels in ASHRAE Standard 90.1–2007 for all ten equipment classes of commercial packaged boilers and its review of the I=B=R directory for each of the eight equipment classes where a metric change occurred. DOE's review of each commercial packaged boiler equipment class will provide its planned course of action for each equipment class, along with reasoning for the suggested action. DOE is using its review of the I=B=R directory for each of the equipment classes to determine if ASHRAE raised the efficiency levels and if further DOE action is warranted. In order for DOE to determine whether ASHRAE raised the efficiency levels for each equipment class, DOE has identified the following from the January 2008 I=B=R directory:

- A comparison of the average combustion efficiency and average thermal efficiency values of the models;
- A comparison of the average combustion efficiency and average thermal efficiency values of the minimally compliant models (*i.e.*, those with efficiency levels that minimally comply with EPCA);
- The model with the lower thermal efficiency value and its corresponding combustion efficiency value;
- The model with the highest thermal efficiency value and its corresponding combustion efficiency value; and
- The percentage of models in the January 2008 I=B=R directory that have a thermal efficiency value lower than the efficiency level specified by ASHRAE Standard 90.1–2007.

DOE used these five statistics to determine whether DOE believes the efficiency levels specified within ASHRAE Standard 90.1–2007 for a given equipment class provide reasonable assurance that ASHRAE increased the efficiency levels and further analysis is warranted by DOE. DOE presents its review of the efficiency levels in ASHRAE Standard 90.1–2007 for each equipment class of commercial packaged boilers as well as its review of the market data in the following subsections.

1. Small, Gas-Fired Hot Water Commercial Packaged Boilers

A small, gas-fired hot water commercial packaged boiler is a commercial packaged boiler with a fuel input at or above 300 and less than or equal to 2,500 kBtu/h, fueled by either natural gas or propane, that supplies hot water for space heating. Small, gas-fired hot water commercial packaged boilers fall under the gas-fired commercial packaged boilers equipment class, whose Federal energy conservation standards, as established by EPCA, are a combustion efficiency of no less than 80.0 percent. (42 U.S.C. 6313(a)(4)(C); 10 CFR 431.87(a)) This equipment class accounts for 23.6 percent of the total models listed in the January 2008 I=B=R directory that DOE examined.

Among all of the small, gas-fired hot water commercial package boilers in the I=B=R directory, DOE calculated the average thermal efficiency to be 0.9 percent lower than the average combustion efficiency. DOE also identified the small, gas-fired hot water commercial packaged boilers with combustion efficiencies that minimally comply with EPCA (*i.e.* , with a combustion efficiency between 80.0 and 81.0 percent). For the minimally compliant small, gas-fired hot water commercial packaged boilers, the average thermal efficiency is 78.1 percent. The model with the lowest thermal efficiency is 76.8 percent, which corresponds to a combustion efficiency of 81 percent. The model with the highest thermal efficiency is 98.1 percent, which corresponds to a combustion efficiency of 98.3 percent. DOE found that of all the models in the 2008 I=B=R directory for this equipment class, 8.9 percent of them have thermal efficiency levels below the ASHRAE Standard 90.1–2007 efficiency level.

ASHRAE Standard 90.1–2007 specifies a thermal efficiency of 80 percent for small, gas-fired hot water commercial packaged boilers. This thermal efficiency value is higher than the 78.1 percent average thermal efficiency of minimally compliant equipment currently on the market. Based on DOE's review of the I=B=R directory and the analysis conducted on the minimally compliant commercial packaged boilers, DOE has tentatively concluded that the thermal efficiency levels in ASHRAE Standard 90.1–2007 would, on average, increase efficiency for small, gas-fired hot water commercial packaged boilers. Consequently, DOE performed a potential energy-savings analysis on this equipment class under section III, as part of DOE's review of amended energy conservation standards.

2. Small, Gas-Fired, Steam, All Except Natural Draft Commercial Packaged Boilers

A small, gas-fired, steam, all except natural draft commercial packaged boiler has a fuel input of at or above 300 and less than or equal to 2,500 kBtu/h, is fueled by either natural gas or propane, supplies steam for space heating and other applications, and uses a type of draft system other than natural

[14] The Air-conditioning, Heating, and Refrigerating Institute, *I=B=R Ratings for Boilers, Baseboard Radiation, Finned Tube (Commercial) Radiation, and Indirect-Fired Water Heaters* (Jan. 2008). Available at: *http://www.gamanet.org/gama/inforesources.nsf/vAttachmentLaunch/E9E5FC7199EBB1BE85256FA100838435/$FILE/01-08_CBR.pdf.*

[15] These anomalous ratings are likely due to Hydronics Institute's (HI) de-rating procedures, manufacturers' interpolation of results, varying test chambers and instrument calibration among manufacturers, or submittal of erroneous ratings.

draft (i.e., a forced or induced draft system). Small, gas-fired, steam, all except natural draft commercial packaged boilers fall under the gas-fired commercial packaged boilers equipment class, whose Federal energy conservation standards, as established by EPCA, are a combustion efficiency of no less than 80.0 percent. (42 U.S.C. 6313(a)(4)(C); 10 CFR 431.87) (a)) These boilers account for 18.5 percent of the total models listed in the January 2008 I=B=R directory.

Among all of the small, gas-fired, steam all except natural draft commercial packaged boilers in the I=B=R directory, DOE calculated the average thermal efficiency to be 2.6 percent lower than the average combustion efficiency. DOE also identified the boilers in this equipment class with combustion efficiencies that minimally comply with EPCA (i.e., with a combustion efficiency between 80.0 and 81.0 percent). The average thermal efficiency of these minimally compliant boilers is 76.9 percent. The lowest thermal efficiency of these models is 75.4 percent, which corresponds to combustion efficiencies of 80 and 80.5 percent. The highest thermal efficiency is 83.1 percent, which corresponds to combustion efficiencies ranging from 83.7 to 84.8 percent. Of the 18.5 percent of units in the 2008 I=B=R directory for this equipment class, 51.2 percent of them have thermal efficiency levels below the ASHRAE Standard 90.1–2007 efficiency level.

ASHRAE Standard 90.1–2007 specifies a thermal efficiency of 79 percent for small, gas-fired, steam, all except natural draft commercial packaged boilers. This thermal efficiency value is higher than the 76.9 percent average thermal efficiency of minimally compliant equipment on the market. Based on DOE's review of the I=B=R directory and the analysis of minimally compliant commercial packaged boilers, DOE has tentatively concluded that the thermal efficiency levels in ASHRAE Standard 90.1–2007 would, on average, result in an increase in efficiency for minimally compliant equipment. Therefore, DOE performed a potential energy-savings analysis on this equipment class under section III.

3. Small, Gas-Fired, Steam, Natural Draft, Commercial Packaged Boilers

A small, gas-fired, steam, natural draft commercial packaged boiler has a fuel input at or above 300 and less than or equal to 2,500 kBtu/h, is fueled by either natural gas or propane, supplies steam for space heating and other applications, and uses a natural draft system (i.e., does not have mechanical draft equipment). Small, gas-fired, steam, natural draft commercial packaged boilers fall under the gas-fired commercial packaged boilers equipment class, whose Federal energy conservation standards, as established by EPCA, are a combustion efficiency of no less than 80.0 percent. (42 U.S.C. 6313(a)(4)(C); 10 CFR 431.87(a)) These boilers account for 1.8 percent of the total models listed in the January 2008 I=B=R directory.

ASHRAE Standard 90.1–2007 set a two-tier efficiency level for this equipment, which includes two different thermal efficiency levels, as well as two effective dates. The first efficiency level specified in ASHRAE Standard 90.1–2007 for this equipment class includes a 77 percent thermal efficiency effective March 2, 2010. The second efficiency level specified by ASHRAE Standard 90.1–2007 for this equipment class includes a 79 percent thermal efficiency effective March 2, 2020.

Among all of the small, gas-fired, steam, natural draft commercial packaged boilers in the I=B=R directory, DOE calculated the average thermal efficiency to be 3.6 percent lower than the average combustion efficiency. DOE also identified the small, gas-fired, steam, natural draft commercial packaged boilers with combustion efficiencies that minimally comply with EPCA (i.e., with a combustion efficiency between 80.0 and 81.0 percent). The average thermal efficiency for the minimally-compliant equipment of this type is 78.2 percent. The model with the lowest thermal efficiency is 77.6 percent, which corresponds to a combustion efficiency of 80.9 percent. The thermal efficiency of the most efficient models is 80.4 percent, which corresponds to combustion efficiencies of between 83.1 and 83.3 percent. In examining all the models in the 2008 I=B=R directory for this equipment class, DOE found that none has a thermal efficiency level below the ASHRAE Standard 90.1–2007 efficiency level effective in 2010, but 66.7 percent have thermal efficiency levels below the ASHRAE Standard 90.1–2007 efficiency level effective in 2020.

Again, ASHRAE Standard 90.1–2007 specifies a thermal efficiency of 77 percent for small, gas-fired, steam, natural draft commercial packaged boilers manufactured on or after March 2, 2010. This is lower than the 78.2 percent average thermal efficiency of minimally-compliant equipment on the market. DOE could not identify any small, gas-fired, steam, natural draft equipment currently in the I=B=R directory with a thermal efficiency value less than 77.6 percent. DOE observed that the minimum thermal efficiency level effective March 2, 2010, in ASHRAE Standard 90.1–2007 appears to be lower than the average thermal efficiencies of boilers that minimally comply with EPCA's combustion energy efficiency standards. DOE believes that the potential consequence of setting thermal efficiency standards at levels lower than the thermal efficiencies of existing equipment would be equipment with lower combustion efficiencies than EPCA permits, meaning that the current minimum required efficiency would be decreased, thereby resulting in backsliding. Therefore, DOE has tentatively decided not to adopt the stage-1 ASHRAE Standard 90.1–2007 efficiency level for small, gas-fired, steam, natural draft commercial packaged boilers.

Because ASHRAE set a two-tier requirement for this product type, DOE then analyzed the second efficiency level set by the amended ASHRAE standard. ASHRAE Standard 90.1–2007 specifies a thermal efficiency of 79 percent for small, gas-fired, steam, natural draft commercial packaged boilers manufactured on or after March 2, 2020. This thermal efficiency value is higher than the 78.2 percent average thermal efficiency of minimally-compliant equipment on the market. Based on DOE's review of the I=B=R directory and the analysis of minimally-compliant commercial packaged boilers, DOE has tentatively concluded that the second thermal efficiency level in ASHRAE Standard 90.1–2007 would, on average, result in an increase in efficiency for small, gas-fired, steam, natural draft commercial packaged boilers manufactured on or after March 2, 2020. Therefore, DOE performed a potential energy-savings analysis on this equipment class under section III.

4. Small, Oil-Fired, Hot Water Commercial Packaged Boilers

A small, oil-fired, hot water commercial packaged boiler has a fuel input at or above 300 and less than or equal to 2,500 kBtu/h, is fueled by oil, and supplies hot water for space heating. Small, oil-fired, hot water commercial packaged boilers fall under the oil-fired commercial packaged boilers equipment class, whose Federal energy conservation standards, as established by EPCA, are a combustion efficiency of no less than 83.0 percent. (42 U.S.C. 6313(a)(4)(D); 10 CFR 431.87(b)) This equipment class accounts for 6.9 percent of the models listed in the January 2008 I=B=R directory.

Among all of the small, oil-fired, hot water commercial packaged boilers in the I=B=R directory, DOE calculated the average thermal efficiency to be 2.3 percent lower than the average combustion efficiency. DOE also identified the small, oil-fired, hot water commercial packaged boilers with combustion efficiencies that minimally comply with EPCA (i.e., with a combustion efficiency between 83.0 and 84.0 percent). The average thermal efficiency of minimally-compliant equipment is approximately 80.7 percent. The thermal efficiency of the least-efficient model is 79.2 percent, which corresponds to a combustion efficiency of 83.2 percent. The thermal efficiency of the most-efficient model is 92.9 percent, which corresponds to a combustion efficiency of 93.3 percent. Of the all the models in the 2008 I=B=R directory for this equipment type, 29.3 percent of them have thermal efficiency levels below the ASHRAE Standard 90.1–2007 efficiency level.

ASHRAE Standard 90.1–2007 specifies a thermal efficiency of 82 percent for small, oil-fired, hot water commercial packaged boilers. This value is higher than the 80.7 percent average thermal efficiency of minimally-compliant equipment on the market. Based on DOE's review of the I=B=R directory and the analysis conducted on the minimally-compliant commercial packaged boilers, DOE has tentatively concluded that the thermal efficiency level in ASHRAE Standard 90.1–2007 would, on average, result in an increase in the efficiency for small, oil-fired, hot water commercial packaged boilers. Therefore, DOE performed a potential energy-savings analysis on this equipment class under section III.

5. Small, Oil-Fired, Steam, Commercial Packaged Boilers

A small, oil-fired, steam commercial packaged boiler has a fuel input at or above 300 and less than or equal to 2,500 kBtu/h, is fueled by oil, and supplies steam for space heating and other applications. Small, oil-fired, steam commercial packaged boilers fall under the oil-fired commercial packaged boilers equipment class, whose Federal energy conservation standards, as established by EPCA, are a combustion efficiency of no less than 83.0 percent. (42 U.S.C. 6313(a)(4)(D); 10 CFR 431.87(b)) These boilers account for 11.6 percent of the total models listed in the January 2008 I=B=R directory.

Among all of the small, oil-fired, steam commercial packaged boilers in the I=B=R directory, DOE calculated the average thermal efficiency to be 2.5 percent lower than the average combustion efficiency. DOE also identified the small, oil-fired, steam commercial packaged boilers with combustion efficiencies that minimally comply with EPCA (i.e., with a combustion efficiency between 83.0 and 84.0 percent). The average thermal efficiency of minimally-compliant equipment is 81.6 percent. The thermal efficiency of the least-efficient model is 79.7 percent, which corresponds to a combustion efficiency of 83.3 percent. The thermal efficiency of the most-efficient models is 85.6 percent, which corresponds to a range of combustion efficiencies from 86.2 to 87.5 percent. Of all the models in the 2008 I=B=R directory for this equipment class, 17.5 percent of them have thermal efficiency levels below the ASHRAE Standard 90.1–2007 efficiency level.

ASHRAE Standard 90.1–2007 specifies a thermal efficiency of 81 percent for small, oil-fired, steam commercial packaged boilers. This value is lower than the 81.6 percent average thermal efficiency of minimally-compliant equipment on the market. DOE identified a single minimally-compliant small, oil-fired steam commercial packaged boiler with a thermal efficiency of 79.7 percent, which is lower than the efficiency level in ASHRAE Standard 90.1–2007. DOE observed that the minimum thermal efficiency level in ASHRAE Standard 90.1–2007 for this equipment class appears to be lower than the average thermal efficiencies of boilers that minimally comply with EPCA's combustion energy efficiency standards. The consequence of setting thermal efficiency standards at levels lower than the thermal efficiencies of existing equipment would be manufacturing of equipment with lower combustion efficiencies than EPCA permits, meaning that the current minimum required efficiency would be decreased in violation of EPCA's ''anti-backsliding'' provision (see Section I.A). (42 U.S.C. 6316(a); 42 U.S.C. 6295(o)(1)) Therefore, DOE has tentatively decided not to adopt the ASHRAE Standard 90.1–2007 efficiency level for small, oil-fired, steam commercial packaged boilers, so no further analysis is required.

6. Large, Gas-Fired, Hot Water Commercial Packaged Boilers

A large, gas-fired, hot water commercial packaged boiler has a fuel input of at or above 2,500 kBtu/h, is fueled by either natural gas or propane, and supplies hot water for space heating. Large, gas-fired, hot water commercial packaged boilers fall under the gas-fired commercial packaged boilers equipment class, whose Federal energy conservation standards, as established by EPCA, are a combustion efficiency of no less than 80.0 percent. (42 U.S.C. 6313(a)(4)(C); 10 CFR 431.87(a)). These boilers account for 4.0 percent of the total models listed in the January 2008 I=B=R directory.

The existing Federal energy conservation standard for this equipment class corresponds to the energy conservation standard in EPCA, which specifies a minimum combustion efficiency no less than 80 percent. (42 U.S.C. 6313(4)(C)) ASHRAE Standard 90.1–2007 specifies a more stringent combustion efficiency of no less than 82 percent. Among all of the large, gas-fired, hot water commercial packaged boilers in the I=B=R directory, DOE calculate the average combustion efficiency to be 83.6 percent, which is 1.6 percent higher than the minimum combustion efficiency levels specified by ASHRAE Standard 90.1–2007. However, the combustion efficiency of approximately 17 percent of this equipment is lower than the minimum efficiency level specified by Standard 90.1–2007. For models with a combustion efficiency lower than 82 percent, ASHRAE Standard 90.1 represents a potential for energy savings. Therefore, DOE performed a potential energy-savings analysis on this equipment class under section III.

7. Large, Gas-Fired, Steam, All Except Natural Draft Commercial Packaged Boilers

A large, gas-fired, steam all except natural draft commercial packaged boiler has a fuel input of at or above 2,500 kBtu/h, is fueled by either natural gas or propane, supplies steam for space heating and other applications, and uses a type of draft system other than natural draft (i.e., a forced or induced draft system). Large, gas-fired, steam, all except natural draft commercial packaged boilers fall under the gas-fired commercial packaged boilers equipment class, whose Federal energy conservation standards, as established by EPCA, are a combustion efficiency of no less than 80.0 percent. (42 U.S.C. 6313(a)(4)(C); 10 CFR 431.87(a)) These boilers account for 12.1 percent of the models listed in the January 2008 I=B=R directory.

Among all of the large, gas-fired steam, all except natural draft commercial packaged boilers in the I=B=R directory, DOE calculated the average thermal efficiency to be 1.5 percent lower than the average combustion efficiency. DOE also identified those boilers with combustion efficiencies that minimally comply with

EPCA (*i.e.*, with a combustion efficiency between 80.0 and 81.0 percent). The average thermal efficiency of minimally-compliant boilers is 78.5 percent. The thermal efficiency of the least efficient model is 75.4 percent, which corresponds to a combustion efficiency of 80.5 percent. The thermal efficiency of the most efficient model is 83.2 percent, which corresponds to a combustion efficiency of 83.4 percent. Of all the models in the 2008 I=B=R directory for this equipment class, 49.1 percent of them have thermal efficiency levels below the ASHRAE Standard 90.1–2007 efficiency level.

ASHRAE Standard 90.1–2007 specifies a thermal efficiency of 79 percent for large, gas-fired, steam, all except natural draft commercial packaged boilers. This value is higher than the 78.5 percent average thermal efficiency of minimally-compliant equipment on the market. Based on DOE's review of the I=B=R directory and the analysis conducted on the minimally-compliant commercial packaged boilers, DOE has tentatively concluded that the thermal efficiency level in ASHRAE Standard 90.1–2007 would, on average, result in an increase in efficiency for minimally-compliant boilers. Therefore, DOE performed a potential energy-savings analysis on this equipment class under section III.

8. Large, Gas-Fired, Steam, Natural Draft, Commercial Packaged Boilers

A large, gas-fired, steam, natural draft commercial packaged boiler has a fuel input of at or above 2,500 kBtu/h, is fueled by either natural gas or propane, supplies steam for space heating and other applications, and uses a natural draft system (*i.e.*, does not have mechanical draft equipment). Large, gas-fired, steam, natural draft commercial packaged boilers fall under the gas-fired commercial packaged boilers equipment class, whose Federal energy conservation standards, as established by EPCA, are a combustion efficiency of no less than 80.0 percent. (42 U.S.C. 6313(a)(4)(C); 10 CFR 431.87(a)) These boilers account for 4.4 percent of the models listed in the January 2008 I=B=R directory.

ASHRAE set a two-tier efficiency level for this equipment, which includes two different thermal efficiency levels and two effective dates. The first efficiency level specified in ASHRAE Standard 90.1–2007 for this equipment class includes a 77 percent thermal efficiency effective March 2, 2010. The second efficiency level specified by ASHRAE Standard 90.1–2007 for this equipment class includes a 79 percent thermal efficiency effective March 2, 2020.

Among all of the large, gas-fired, steam, natural draft commercial packaged boilers, DOE calculated the average thermal efficiency to be 1.8 percent lower than the average combustion efficiency. DOE also identified the large, gas-fired, steam, natural draft commercial packaged boilers with combustion efficiencies that minimally comply with EPCA (*i.e.*, with a combustion efficiency between 80.0 and 81.0 percent). The average thermal efficiency of minimally-compliant boilers is approximately 79.1 percent. The thermal efficiency of the least efficient models is 78.6 percent, which corresponds to a combustion efficiency of 82.1 percent. The thermal efficiency of the most efficient models is 81.1 percent, which corresponds to a range of combustion efficiencies from 82.2 to 82.4 percent. In examining all the models in the 2008 I=B=R directory for this equipment class, DOE found that none has a thermal efficiency level below the ASHRAE Standard 90.1–2007 efficiency level effective in 2010, but 15.5 percent have thermal efficiency levels below the ASHRAE Standard 90.1–2007 efficiency level effective in 2020.

Again, ASHRAE Standard 90.1–2007 specifies a thermal efficiency of 77 percent for large, gas-fired, steam, natural draft commercial packaged boilers manufactured on or after March 2, 2010. This value is lower than the 79.1 percent average thermal efficiency of minimally-compliant equipment on the market. DOE could not identify any large, gas-fired, steam, natural draft equipment in the I=B=R directory with a thermal efficiency value less than 78.6 percent. The minimum thermal efficiency level effective March 2, 2010, in ASHRAE Standard 90.1–2007 appears to be lower than any of the thermal efficiencies of boilers that are currently available on the market. DOE believes that the potential consequence of setting thermal efficiency standards at levels lower than the thermal efficiencies of existing equipment would be equipment having lower combustion efficiencies than EPCA permits, meaning that the current minimum required efficiency would be decreased, thereby resulting in backsliding. Therefore, DOE has tentatively decided not to adopt the stage-1 ASHRAE Standard 90.1–2007 efficiency level for this equipment class.

Because ASHRAE set a two-tiered requirement for this product type, DOE then analyzed the second efficiency level set by the amended ASHRAE standard. ASHRAE Standard 90.1–2007 specifies a thermal efficiency of 79 percent for large, gas-fired, steam, natural draft commercial packaged boilers manufactured on or after March 2, 2020. This value is slightly lower than the 79.1 percent average thermal efficiency of minimally compliant equipment on the market. However, 15.5 percent of the equipment DOE analyzed has a thermal efficiency lower than the efficiency level in ASHRAE Standard 90.1–2007. Based on DOE's review of the I=B=R directory and the analysis conducted on minimally-compliant commercial packaged boilers, DOE has tentatively concluded that the thermal efficiency level specified by ASHRAE Standard 90.1–2007 effective March 2, 2020 would result in an increase in efficiency for small, gas-fired, steam, natural draft commercial packaged boilers manufactured on or after March 2, 2020 (compared to the EPCA combustion efficiency level). Therefore, DOE performed a potential energy-savings analysis on this equipment class under section III.

9. Large, Oil-Fired, Hot Water Commercial Packaged Boilers

A large, oil-fired, hot water commercial packaged boiler has a fuel input at or above 2,500 kBtu/h, is fueled by oil, and supplies hot water for space heating. Large, oil-fired, hot water commercial packaged boilers fall under the oil-fired commercial packaged boilers equipment class, whose Federal energy conservation standards, as established by EPCA, are a combustion efficiency of no less than 83.0 percent. (42 U.S.C. 6313(a)(4)(D); 10 CFR 431.87(b)) These boilers account for 1.9 percent of the models listed in the January 2008 I=B=R directory.

ASHRAE Standard 90.1–2007 adopted a more stringent combustion efficiency of 84 percent. Among all of the large, oil-fired, hot water commercial packaged boilers, DOE calculated the average combustion efficiency to be approximately 86.5 percent, 2.5 percent higher than the minimum combustion efficiency levels specified by ASHRAE Standard 90.1–2007. The minimum combustion efficiency of all large, oil-fired, hot water equipment on the market is 85.5 percent, which is 1.5 percent higher than the minimum level adopted by ASHRAE Standard 90.1–2007. Based on this, DOE believes there will be no potential energy savings resulting from adopting ASHRAE Standard 90.1–2007 for large, oil-fired, hot water commercial packaged boilers. However, DOE did perform a potential energy-savings analysis in section III, which examined efficiency levels more

stringent than those contained within ASHRAE Standard 90.1–2007.

10. Large, Oil-Fired, Steam Commercial Packaged Boilers

A large, oil-fired, steam commercial packaged boiler has a fuel input at or above 2,500 kBtu/h, is fueled by oil, and supplies steam for space heating and other applications. Large, oil-fired, steam commercial packaged boilers fall under the oil-fired commercial packaged boilers equipment class, whose Federal energy conservation standards, as established by EPCA, are a combustion efficiency of no less than 83.0 percent. (42 U.S.C. 6313(a)(4)(D); 10 CFR 431.87(b)) These boilers account for 15.2 percent of the models listed in the January 2008 I=B=R directory.

Among all of the large, oil-fired, steam commercial packaged boilers, DOE calculated the average thermal efficiency to be 1.5 percent lower than the average combustion efficiency. DOE also identified the large, oil-fired, steam commercial packaged boilers with combustion efficiencies that minimally comply with EPCA (*i.e.*, with a combustion efficiency between 83.0 and 84.0 percent). For the minimally-compliant large, oil-fired, steam commercial packaged boilers, the average thermal efficiency is 82.0 percent. The thermal efficiency of the least efficient model is 81.0 percent, which corresponds to a combustion efficiency of 84.6 percent. The thermal efficiency of the most efficient model is 85.8 percent, which corresponds to a combustion efficiency of 86.0 percent. In examining all the models in the 2008 I=B=R directory for this equipment class, DOE found that none had a thermal efficiency level below the ASHRAE Standard 90.1–2007 efficiency level.

ASHRAE Standard 90.1–2007 specifies a thermal efficiency of 81 percent for large, oil-fired, steam commercial packaged boilers. This value is lower than the 82.0 percent average thermal efficiency of minimally-compliant equipment on the market. DOE could not identify any small, gas-fired, steam, natural draft equipment currently in the I=B=R directory with a thermal efficiency value less than 81.0 percent. The minimum thermal efficiency level in ASHRAE Standard 90.1–2007 appears to be lower than the average thermal efficiencies of boilers that minimally comply with EPCA's combustion energy efficiency standards. DOE believes that the potential consequence of setting thermal efficiency standards at levels lower than the thermal efficiencies of existing equipment would be equipment having lower combustion efficiencies than EPCA permits, meaning that the current minimum required efficiency would be decreased in violation of EPCA's ''anti-backsliding'' provision (see Section I.A). (42 U.S.C. 6316(a); 42 U.S.C. 6295(o)(1)) Therefore, DOE has tentatively decided not to adopt the ASHRAE Standard 90.1–2007 efficiency level for large, oil-fired, steam, commercial packaged boilers, so no further analysis is required.

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 90.1–2007, as well as more stringent efficiency levels than those specified in ASHRAE Standard 90.1–2007. 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 90.1–2007 increased the efficiency levels. Based upon the analyses performed in section II, DOE is conducting the energy-savings analysis for eight equipment classes of commercial packaged boilers.

The following discussion provides an overview of the energy-savings analysis conducted for those products, which had increased efficiency levels under ASHRAE Standard 90.1–2007, 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 (with amended standards). The national energy savings (NES) refers to cumulative energy savings from 2012 through 2042. 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, including changes in shipments and retirement rates in response to changes in equipment costs due to standards.

DOE calculated the potential energy savings by subtracting energy use under a standards scenario from energy use in a base case scenario. DOE estimated unit energy savings for each equipment class based on data from the 2000 Screening Analysis [16] for various heating equipment and the 2008 I=B=R directory. To estimate the total energy savings for each efficiency level, DOE first calculated the national site energy consumption (*i.e.* , the energy directly consumed by the units of equipment in operation) for each class of commercial packaged boilers for the base case forecast and the standards case forecast. Second, DOE determined the annual site energy savings, consisting of the difference in site energy consumption between the base case and the standards case. Third, DOE converted the annual site energy savings into the annual amount of energy saved at the source of gas generation (the source energy) using a site-to-source conversion factor. Finally, DOE estimated the source energy savings from 2012 to 2042 to calculate the total potential energy savings for that period. DOE performed these calculations for each efficiency level within a given equipment class of commercial packaged boilers. Details of the energy-savings analysis are presented below.

A. Annual Energy Use

DOE started with the annual energy use calculation methodology presented in the 2000 Screening Analysis for today's estimation of potential energy savings. For commercial packaged boilers, DOE used a modified full-load equivalent operating hours (FLEOH) to calculate the annual energy use as estimated in the 2000 Screening Analysis. FLEOH is the ratio of the total annual thermal energy output (either heating or cooling) provided by the equipment over the course of a year divided by equipment capacity. It is equal to the total number of hours that a piece of equipment would have to run at its rated capacity to provide total thermal energy output equivalent to that provided over the course of a year.

The total annual standby loss is largely a function of the period available for operation (hot standby period). Because this period is an operation issue and not specific to equipment design and climate location, DOE believes the standby loss can be captured in a simplified analysis, as in the 2000 Screening Analysis. For that analysis, DOE adjusted the boiler FLEOHs by calculating a standby loss factor (as described in Appendix A of the 2000 Screening Analysis). DOE determined the national average

[16] U.S. Department of Energy, *Screening Analysis for EPACT-Covered Commercial HVAC and Water-Heating Equipment* (April 2000). Available at: *http://www.eere.energy.gov/buildings/highperformance/pdfs/screening_analysis_main.pdf.*

FLEOHs to be 952 hours, regardless of boiler input fuel type, input capacity, or output type (*i.e.*, steam or hot water).

The Screening Analysis methodology provides a linear relationship between annual energy consumption and thermal efficiency. DOE used this linear relationship and the FLEOHs to calculate the annual energy use per unit within a given equipment class at a specific efficiency level using the following equation:

$$\text{Annual Energy Use} = \frac{\text{FLEOH}_{\text{2000 Screening Analysis}} \times \text{Output Capacity}_{\text{100\% Efficiency}}}{\eta_{\text{Shipment Weighted Average}}}, \qquad \text{(Eq. 1)}$$

Where:

- The annual energy use is the amount of energy used each year for a given equipment class at a given efficiency level in Btus;
- The $\text{FLEOH}_{\text{2000 Screening Analysis}}$ is the FLEOHs calculated in the 2000 Screening Analysis (i.e., 952.2 hours);
- The $\text{Output Capacity}_{\text{100\% Efficiency}}$ is the total output capacity when the equipment is assumed to be at 100 percent efficiency (*i.e.*, output capacity = input capacity) in Btu/h; and
- $\eta_{\text{Shipment Weighted Average}}$ is the average shipment-weighted efficiency, which is calculated for each standards case within each equipment class.

B. Shipments

DOE obtained data on annual shipments for commercial packaged boilers in 2007 from AHRI, totaling approximately 36,000 units. Then, DOE used the 2008 I=B=R directory to determine the percentage of models within each equipment class. DOE applied this percentage to estimate the number of unit shipments for each equipment class. Table III.1 exhibits the total shipment breakdown by equipment class.

TABLE III.1.—TOTAL SHIPMENTS OF COMMERCIAL PACKAGED BOILERS BY EQUIPMENT CLASS

Equipment class	Percentage of models (%)*	Approximate total shipments (units per year)
Small, Gas-Fired, Hot Water	23.6	8,500
Small, Gas-Fired, Steam, All Except Natural Draft	18.5	6,700
Small, Gas-Fired, Steam, Natural Draft	1.8	650
Small, Oil-Fired, Hot Water	6.9	2,500
Small, Oil-Fired, Steam	11.6	4,200
Large, Gas-Fired, Hot Water	4	1,500
Large, Gas-Fired, Steam, All Except Natural Draft	12.1	4,400
Large, Gas-Fired, Steam, Natural Draft	4.4	1,600
Large, Oil-Fired, Hot Water	1.9	700

* Note that the identified boilers in this table do not add to 100 percent of annual shipments, because large, oil-fired, steam boilers (which constitute 15.2 percent of the market) are not included. Large, oil-fired, steam boilers are not included because the efficiency level in ASHRAE Standard 90.1–2007 would result in backsliding and accordingly cannot be adopted as a national standard.

DOE then reviewed the 2008 I=B=R directory to determine the distribution of efficiency levels for commercially-available models within each equipment class. DOE bundled the efficiency levels into ''efficiency ranges'' and determined the percentage of models within each range. DOE applied the percentages of models within each range to the total unit shipments for a given equipment class to estimate the distribution of shipments within the base case. To determine the percentage of models in each efficiency range, DOE considered models greater than or equal to the lower bound of the efficiency range and models with efficiencies less than the upper bound of the efficiency range. For example, for the thermal efficiency range of 79–80 percent, DOE considered models with thermal efficiency levels from 79.0 to 79.9 to be within this range. In the case of the last efficiency range identified for each equipment class, DOE included those models with efficiency levels equal to the higher bound (*i.e.*, the max-tech efficiency levels). 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.[17]

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). Information available to DOE suggests 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.2 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 small, gas-fired, steam, all except natural draft commercial packaged boilers. For all the tables of the distribution of efficiencies in the base case and standards cases by equipment class, see the ASHRAE NODA TSD.

[17] The ASHRAE NODA TSD is available on the Web page for ASHRAE Products at: *http://www.eere.energy.gov/buildings/appliance_standards/commercial/ashrae_products_docs_meeting.html.*

TABLE III.2.—DISTRIBUTION OF EFFICIENCIES IN THE BASE CASE AND STANDARDS CASES FOR SMALL, GAS-FIRED, STEAM, ALL EXCEPT NATURAL DRAFT COMMERCIAL PACKAGED BOILERS

Efficiency Range (E_T)	75.4–77 (percent)	77–79 (percent)	79–80* (percent)	80–81 (percent)	81–82 (percent)	82–83 (percent)	83–83.1 (percent)
Base Case—Current Market	18	33	22	19	4	1	3
Efficiency Level 1—ASHRAE (79% E_T)	.....	.....	73	19	4	1	3
Efficiency Level 2—(80% E_T	.....	.....	.....	92	4	1	3
Efficiency Level 3—(81% E_T)	.....	.....	.....	.....	96	1	3
Efficiency Level 4—(82% E_T)	.....	.....	.....	.....	.....	97	3
Efficiency Level 5—''Max-Tech''—(83.1%) E_T)	.....	.....	.....	.....	.....	.....	100

*The highlighted column indicates the efficiency level specified by ASHRAE Standard 90.1–2007 for this equipment class.

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 2 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 of commercial packaged boilers analyzed in today's NODA, DOE calculated the shipment-weighted average efficiency values. The shipment-weighted average efficiency value represents the average efficiency of the total units shipped at a specified amended standard level. DOE used the weighted average efficiency values in Equation 1 (discussed previously) to calculate the annual energy use of the equipment class at a given efficiency level. For the baseline efficiency level, DOE used the average thermal efficiency value for each equipment class of the models below the efficiency level in ASHRAE Standard 90.1–2007. The shipment-weighted average efficiency values for the base case and the standards cases for each efficiency analyzed within the eight equipment classes is provided in the ASHRAE NODA TSD found on DOE's Web site.

For small, commercial packaged boilers, DOE calculated the annual energy consumption based on three input capacities (*i.e.*, 400 kBtu/h, 800 kBtu/h, and 1500 kBtu/h). DOE then reviewed the 2008 I=B=R directory to determine the distribution of input capacities for commercially-available models within each equipment class. DOE bundled the efficiency levels into ''capacity ranges'' and determined the percentage of models within each range. DOE applied the percentages of models within each range to the total unit shipments for a given equipment class to estimate the distribution of capacities within the base case and higher efficiency levels examined. To determine the percentage of models in each capacity range, DOE considered commercial packaged boilers with an input capacity equal to or greater than 300 kBtu/h and less than 600 kBtu/h to be represented by the energy use of the 400 kBtu/h model. DOE considered commercial packaged boilers with an input capacity equal to or greater than 600 kBtu/h and less than 1150 kBtu/h to be represented by the energy use of the 800 kBtu/h model. DOE considered commercial packaged boilers with an input capacity equal to or greater than 1150 kBtu/h and less than 2500 kBtu/h to be represented by the energy use of the 1500 kBtu/h model.

For large, commercial packaged boilers, DOE calculated the annual energy consumption based on one input capacity (*i.e.*, 3000 kBtu/h). DOE considered commercial packaged boilers with an input capacity equal to or greater than 2500 kBtu/h to be represented by the energy use of the 3000 kBtu/h model. The distribution of input capacities in the base case for each equipment class can be found in the ASHRAE NODA TSD.

DOE seeks input on its determination of the base-case distribution of capacities and its prediction on how amended energy conservation standards would affect the distribution of capacities in the standard case. DOE identified this as Issue 3 under ''Issues on Which DOE Seeks Comment'' in section IV.B of this NODA.

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 gas generation (*i.e.*, primary energy), using an average site-to-source conversion factor over the analysis period (calculated from the Energy Information Agency's (EIA's) Annual Energy Outlook 2008 (AEO2008) projections).[18] The site-to-source conversion factor is the multiplicative factor DOE uses for converting site energy consumption (the energy used at the end-use site) into primary or source energy consumption (the energy used at the source before transmission or conversion losses). For the NODA, DOE calculated the average site-to-source conversion factor using the same analysis period (*i.e.*, 2012–2042) as EIA's *AEO2008*. DOE derived the annual conversion factors by dividing the total energy used to produce gas in each forecast year in the United States, as indicated in *AEO2008*, by the total gas delivered for each forecasted year. DOE determined the 30-year average to be 1.097.

[18] U.S. Department of Energy. Energy Information Administration, Annual Energy Outlook 2008 with Projections to 2030 (June 2008). Available at *http://www.eia.doe.gov/oiaf/aeo/index.html.*

2. Effective Date

Generally, covered equipment to which a new or amended energy conservation standard applies must comply with the standard if such equipment is manufactured or imported on or after a specified date.

In today's NODA, DOE is evaluating potential energy savings estimates for commercial packaged boilers at the efficiency levels specified by ASHRAE Standard 90.1–2007 and at more stringent efficiency levels than those in ASHRAE Standard 90.1–2007. If DOE were to propose a rule prescribing energy conservation standards at the efficiency levels contained in ASHRAE Standard 90.1–2007, EPCA states that any such standards shall become effective on or after a date which is two years after the effective date of the applicable minimum energy efficiency requirement in the amended ASHRAE/IES standard (*i.e.*, ASHRAE Standard 90.1–2007) (42 U.S.C. 6313(a)(6)(D)). DOE has applied this two-year implementation period to determine the effective date of any energy conservation standard equal to the efficiency levels specified by ASHRAE Standard 90.1–2007 prescribed by this rulemaking. Thus, if DOE decides to adopt the levels in ASHRAE Standard 90.1–2007 (*i.e.* , ones where efficiency levels were set in two stages), the rule

would apply to products manufactured on or after 2012 or 2022, respectively, which is two years from the effective date specified in ASHRAE Standard 90.1–2007 since the effective date in ASHRAE Standard 90.1–2007 is January 1, 2010 for certain other equipment classes of commercial packaged boilers or January 1, 2020 for certain equipment classes of commercial packaged boilers.

If DOE were to propose a rule prescribing energy conservation standards higher than the efficiency levels contained in ASHRAE Standard 90.1–2007, EPCA states that any such standards ''shall become effective for products manufactured on or after a date which is four years after the date such rule is published in the **Federal Register**'' (42 U.S.C. 6313(a)(6)(D)). DOE has applied this four-year implementation period to determine the effective date of any energy conservation standard higher than the efficiency levels specified by ASHRAE Standard 90.1–2007 that might be prescribed in a future rulemaking. Thus, for products which DOE might adopt a level more stringent than the ASHRAE efficiency levels, the rule would apply to products manufactured on or after July 2013, which is four years from the date of publication of the final rule since DOE expects to issue a final rule for this proceeding around July 2009.

For each equipment class for which DOE developed a potential energy savings analysis, Table III.3 exhibits the approximate effective dates of an amended energy conservation standard.

TABLE III.3.—APPROXIMATE EFFECTIVE DATE OF AN AMENDED ENERGY CONSERVATION STANDARD FOR EACH EQUIPMENT CLASS OF COMMERCIAL PACKAGED BOILERS

Equipment class	Approximate effective date for adopting the efficiency levels in ASHRAE Standard 90.1–2007	Approximate effective date for adopting more stringent efficiency levels than those in ASHRAE Standard 90.1–2007
Small, Gas-Fired, Hot Water Commercial Packaged Boilers	01/2012	07/2013
Small, Gas-Fired, Steam, All Except Natural Draft Commercial Packaged Boilers	01/2012	07/2013
Small, Gas-Fired, Steam, Natural Draft Commercial Packaged Boilers	01/2022	07/2013
Small, Oil-Fired, Hot Water Commercial Packaged Boilers	01/2012	07/2013
Small, Oil-Fired, Steam Commercial Packaged Boilers	01/2012	07/2013
Large, Gas-Fired, Hot Water Commercial Packaged Boilers	01/2012	07/2013
Large, Gas-Fired, Steam, All Except Natural Draft Commercial Packaged Boilers	01/2022	07/2013
Large, Gas-Fired, Steam, Natural Draft Commercial Packaged Boilers	01/2012	07/2013
Large, Oil-Fired, Hot Water Commercial Packaged Boilers	01/2012	07/2013

3. Analysis Period and Lifetime

DOE used an analysis period of 30 years spanning 2012 to 2042 for examining both the ASHRAE efficiency levels and the more stringent efficiency levels that were considered in the analysis. This period coincides with the lifetime of a commercial packaged boiler, which DOE found to be 30 years in the 2000 Screening Analysis.

DOE assumed that the installed base of each equipment class in 2012 will not increase from its current levels (*i.e.*, total unit shipments remain constant). For commercial packaged boilers (which have long equipment lifetimes), the installed base likely will not change significantly by 2012, an assumption based on historical values for shipments of commercial packaged boilers.

DOE calculated the total energy savings from 2012 to 2042 based on the assumption that any new technology or technology switching prompted by an amended energy conservation standard will diffuse into the stock linearly over the lifetime of the equipment (*i.e.*, over the 30-year analysis period). Although manufacturers are required to comply with a new standard level as soon as it becomes effective, the products that are actually being used by consumers are not replaced with more-efficient equipment until the old equipment is retired. Therefore, DOE is assuming that older equipment is retired and replaced with newer, more-efficient equipment linearly over the analysis period. DOE calculated the total actual energy savings over the lifetime of the equipment by calculating the total energy consumption for each equipment class at each efficiency level over the analysis period using the following equation:

$$EnergyUse_{2012-2042} = \sum_{year}^{2042} Shipments_{year} * AEC_{year} * (Minimum\,[Life,\,(2042 - year)\,]\,) \qquad (\text{Eq. } 2)$$

The annual energy savings represents the total energy saved each year by replacing the entire installed stock of the equipment at base-case efficiencies with equipment consuming energy at the amended energy conservation standard level (*i.e.*, at standards case efficiencies).

Special consideration was given to small and large, gas-fired, steam, natural draft, commercial packaged boilers, because for both of these products, ASHRAE Standard 90.1–2007 specifies two tiers of efficiency levels, with one level that goes into effect in the year 2010, and another, more stringent efficiency level that becomes effective in the year 2020.[19] DOE has tentatively decided not to adopt the efficiency levels effective in 2010 because they appear to be less stringent than the

[19] EPCA states if DOE adopts amended national energy conservation standards for commercial packaged boilers based on that ASHRAE Standard 90.1 efficiency levels, such standards shall become effective two years after the effective date of the applicable minimum energy efficiency requirement in the amended ASHRAE Standard 90.1. (42 U.S.C. 6313(a)(6)(D)) Thus, for purposes of DOE regulations, the effective dates of the 2010 and 2020 ASHRAE Standard 90.1–2007 efficiency levels would be 2012 and 2022, respectively.

current Federal energy conservation standards, and analyzed only the ASHRAE Standard 90.1–2007 efficiency levels effective 2020 for both of these equipment classes. Because the second tier of efficiency standards becomes effective ten years after the beginning of the analysis period, DOE adjusted the total energy savings to account for the delay in effective date. For the first ten years of the analysis period (*i.e.*, 2012 to 2022), there would be no energy savings for these two equipment classes. Over the remaining 20 years of the analysis period, DOE assumed more-efficient equipment required by an amended energy conservation standard would diffuse into the existing stock of equipment linearly over the analysis period as older equipment is retired.

Because the lifetime of commercial packaged boilers was assumed to be 30 years and because only 20 years is remaining in the analysis period when these latter ASHRAE Standard 90.1–2007 efficiency levels would go into effect for these two equipment classes, only two-thirds of commercial packaged boiler equipment stock would be at efficiency levels at or above those specified by ASHRAE Standard 90.1–2007 at the end of the analysis period. The remaining one-third of the stock would still be at the same efficiency as it was before the standard levels were amended. The remaining one-third of the stock would then be retired over the following 10 years (after the analysis period has ended) and replaced with equipment that meets or exceeds the efficiency levels specified in ASHRAE Standard 90.1–2007.

For efficiency levels more stringent than those efficiency levels specified by ASHRAE Standard 90.1–2007, DOE used a delayed implementation date, which coincides with the effective dates that are required consistent with EPCA. For the first two years of the analysis period (*i.e.*, 2012 to 2014), there would be no energy savings if DOE were to adopt more stringent efficiency levels than those specified in ASHRAE Standard 90.1–2007 when the ASHRAE Standard 90.1–2007 efficiency levels are effective in 2010. For the first 12 years of the analysis period (*i.e.*, 2012 to 2024), there would be no energy savings if DOE were to adopt the efficiency levels specified in ASHRAE Standard 90.1–2007 when the ASHRAE Standard 90.1–2007 efficiency levels are effective in 2020. Over the remaining 28 years of the analysis period for those efficiency levels where ASHRAE specifies an effective date of 2010, DOE assumed more-efficient equipment required by an amended energy conservation standard would diffuse into the existing stock of equipment linearly over the analysis period (commencing in 2012) as older equipment is retired.

D. Estimates of Potential Energy Savings

DOE estimated the potential primary energy savings in trillions of Btus for each efficiency level considered within each equipment class of commercial packaged boilers. DOE did not analyze the first set of ASHRAE Standard 90.1–2007 efficiency levels with 2010 effective dates for large, gas-fired, steam, natural draft commercial packaged boilers and for small, gas-fired, steam, natural draft commercial packaged boilers. Table III.4—Table III.12 show the potential energy savings for commercial packaged boilers resulting from the analyses conducted as part of this NODA.

TABLE III.4.—POTENTIAL ENERGY SAVINGS FOR SMALL, GAS-FIRED, HOT WATER COMMERCIAL PACKAGED BOILERS

Efficiency level	Primary energy savings estimate* (trillion Btu)
Level 1—ASHRAE—80% E_T	13.3
Level 2—82% E_T	18.7
Level 3—84% E_T	64.0
Level 4—86% E_T	127.5
Level 5—92% E_T	320.0
Level 6—"Max-Tech"—98.1% E_T	483.3

*DOE calculated the potential energy savings from making the efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2007, using the efficiency levels in Standard 90.1–2007 as the baseline.

TABLE III.5.—POTENTIAL ENERGY SAVINGS ESTIMATES FOR SMALL, GAS-FIRED, STEAM, ALL EXCEPT NATURAL DRAFT COMMERCIAL PACKAGED BOILERS

Efficiency level	Primary energy savings estimate* (trillion Btu)
Level 1—ASHRAE—79% E_T	63.1
Level 2—80% E_T	24.7
Level 3—81% E_T	65.1
Level 4—82% E_T	106.2
Level 5—"Max-Tech"—83.1% E_T	150.9

*DOE calculated the potential energy savings from making the efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2007, using the efficiency levels in Standard 90.1–2007 as the baseline.

TABLE III.6.—POTENTIAL ENERGY SAVINGS ESTIMATES FOR SMALL, GAS-FIRED, STEAM, NATURAL DRAFT COMMERCIAL PACKAGED BOILERS

Efficiency level	Primary energy savings estimate* (trillion Btu)
Level 1—ASHRAE—79% E_T	1.7
Level 2—"Max-Tech"—80.4% E_T	6.6

*DOE calculated the potential energy savings from making the efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2007, using the efficiency levels in Standard 90.1–2007 as the baseline.

TABLE III.7.—POTENTIAL ENERGY SAVINGS ESTIMATES FOR SMALL, OIL-FIRED, HOT WATER COMMERCIAL PACKAGED BOILERS

Efficiency level	Primary energy savings estimate* (trillion Btu)
Level 1—ASHRAE—82% E_T	7.9
Level 2—84% E_T	12.5
Level 3—86% E_T	28.1
Level 4—88% E_T	47.4
Level 5—"Max-Tech"—92.9% E_T	84.7

*DOE calculated the potential energy savings from making the efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2007, using the efficiency levels in Standard 90.1–2007 as the baseline.

TABLE III.8.—POTENTIAL ENERGY SAVINGS ESTIMATES FOR SMALL, OIL-FIRED, STEAM COMMERCIAL PACKAGED BOILERS

Efficiency level	Primary energy savings estimate* (trillion Btu)
Level 1—ASHRAE—81% E_T	5.5
Level 2—82% E_T	10.3
Level 3—83% E_T	29.9
Level 4—84% E_T	53.5
Level 5—"Max-Tech"—85.6% E_T	67.5

*DOE calculated the potential energy savings from making the efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2007, using the efficiency levels in Standard 90.1–2007 as the baseline.

TABLE III.9.—POTENTIAL ENERGY SAVINGS ESTIMATES FOR LARGE, GAS-FIRED, HOT WATER COMMERCIAL PACKAGED BOILERS

Efficiency level	Primary energy savings estimate* (trillion Btu)
Level 1—ASHRAE—82% E_C	5.5
Level 2—83% E_C	13.1
Level 3—84% E_C	34.5
Level 4—85% E_C	57.1
Level 5—"Max-Tech"—96.9% E_C	321.4

* DOE calculated the potential energy savings from making the efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2007, using the efficiency levels in Standard 90.1–2007 as the baseline.

TABLE III.10.—POTENTIAL ENERGY SAVINGS ESTIMATES FOR LARGE, GAS-FIRED, STEAM, ALL EXCEPT NATURAL DRAFT COMMERCIAL PACKAGED BOILERS

Efficiency level	Primary energy savings estimate* (trillion Btu)
Level 1—ASHRAE—79% E_T	53.4
Level 2—80% E_T	47.0
Level 3—81% E_T	118.6
Level 4—82% E_T	190.4
Level 5—"Max-Tech"—83.2% E_T	276.5

* DOE calculated the potential energy savings from making the efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2007, using the efficiency levels in Standard 90.1–2007 as the baseline.

TABLE III.11.—POTENTIAL ENERGY SAVINGS ESTIMATES FOR LARGE, GAS-FIRED, STEAM, NATURAL DRAFT COMMERCIAL PACKAGED BOILERS

Efficiency level	Primary energy savings estimate* (trillion Btu)
Level 1—ASHRAE—79% E_T	1.8
Level 2—80% E_T	18.5
Level 3—"Max-Tech"—81.1% E_T	34.2

* DOE calculated the potential energy savings from making the efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2007, using the efficiency levels in Standard 90.1–2007 as the baseline.

TABLE III.12.—POTENTIAL ENERGY SAVINGS ESTIMATES FOR LARGE, OIL-FIRED, HOT WATER COMMERCIAL PACKAGED BOILERS

Efficiency level	Primary energy savings estimate* (trillion Btu)
Level 1—86% E_C	**0
Level 2—87% E_C	4.8
Level 3—"Max-Tech"—88.5% E_C	23.3

* DOE calculated the potential energy savings from making the efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2007, using the efficiency levels in Standard 90.1–2007 as the baseline.

** The current market average efficiency is 86% combustion efficiency, which is higher than the efficiency level specified by ASHRAE Standard 90.1–2007. Thus, the potential energy savings from adopting the ASHRAE Standard 90.1–2007 efficiency level for large, oil-fired, hot water commercial packaged boilers is zero.

IV. Public Participation

A. Submission of Comments

DOE will accept comments, data, and information regarding this NODA no later than August 15, 2008. Please submit comments, data, and information electronically to the following e-mail address: *ASHRAE_90.1_rulemaking@ee.doe.gov*. Submit electronic comments in WordPerfect, Microsoft Word, PDF, or text (ASCII) file format and avoid the use of special characters or any form of encryption. Comments in electronic format should be identified by the docket number, EERE–2008–BT–STD–0013, and/or RIN 1904–AB83, and whenever possible should carry the electronic signature of the author. Alternatively, comments may be submitted to the address provided at the beginning of this notice in the **ADDRESSES** section (which generally provides instructions for submission of comments in both electronic and hard-copy forms). No telefacsimiles (faxes) will be accepted.

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 two copies. One copy of the document shall include all the information believed to be confidential, and the other copy of the document shall have the information believed to be confidential deleted. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

Factors that DOE considers 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.

B. Issues on Which DOE Seeks Comment

DOE is interested in receiving comments on all aspects of this NODA. DOE especially invites comments or data to improve DOE's analysis, including data or information that will respond to the following questions or concerns:

1. DOE surveyed the AHRI Directory of Certified Product Performance and did not identify any water-cooled and evaporatively-cooled commercial packaged air conditioners on the market with a cooling capacity at or above 240,000 Btu/h. Therefore, DOE did not perform a potential energy-savings analysis on this equipment type. DOE seeks comments from interested parties on the market for and energy-savings potential of water-cooled and evaporatively-cooled commercial package air conditioners and heat pumps with a cooling capacity at or above 240,000 Btu/h.

2. DOE seeks input on the base-case distribution of efficiencies and its prediction of how amended energy conservation standards would affect the distribution of efficiencies in the standards case. DOE used the distribution of models in the 2008 I=B=R directory as the basis for analysis.

3. DOE seeks input on the base-case distribution of capacities and its prediction of how amended energy conservation standards will affect the distribution of capacities in the standards case. DOE used the distribution of models in the 2008 I=B=R directory as the basis for analysis.

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