Federal Register

Wednesday,
July 22, 2009

Part II

Department of Energy

10 CFR Part 431

Energy Conservation Program for Certain Industrial Equipment: Energy Conservation Standards and Test Procedures for Commercial Heating, Air-Conditioning, and Water-Heating Equipment; Final Rule

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 and Test Procedures for Commercial Heating, Air-Conditioning, and Water-Heating Equipment

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

ACTION: Final rule.

SUMMARY: The U.S. Department of Energy (DOE) is adopting amended energy conservation standards for commercial packaged boilers and adopting a new energy conservation standard for 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 at the efficiency levels specified in the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)/Illuminating Engineering Society of North America (IESNA) Standard 90.1–2007. DOE has determined that the ASHRAE Standard 90.1–2007 efficiency levels for commercial packaged boilers are more stringent than the existing Federal energy conservation standards and will result in economic and energy savings compared to existing energy conservation standards. Furthermore, DOE has concluded that clear and convincing evidence does not exist, as would justify more-stringent standard levels than the efficiency levels in ASHRAE Standard 90.1–2007. In addition, DOE is adopting related amendments to its test procedures for commercial packaged boilers.

DATES: This rule is effective September 21, 2009. The standards for commercial packaged boilers established in this final rule will apply starting on March 2, 2012. The standards for 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 established in this final rule will apply starting on January 10, 2011. The incorporation by reference of certain publications listed in this final rule was approved by the Director of the Federal Register on September 21, 2009.

ADDRESSES: For access to the docket to read background documents or comments received, visit the U.S. Department of Energy, Resource Room of the Building Technologies Program, 950 L'Enfant Plaza, SW., 6th Floor, 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 regarding visiting the Resource Room. You may also obtain copies of the final rule in this proceeding, related documents (*e.g.,* the notice of proposed rulemaking and technical support document DOE used to reassess whether to adopt certain efficiency levels in ASHRAE Standard 90.1), draft analyses, public meeting materials, and related test procedure documents from the Office of Energy Efficiency and Renewable Energy's Web site at: *http://www1.eere.energy.gov/buildings/appliance_standards/commercial/ashrae_products_docs_meeting.html.*

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

Mr. Michael Kido 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) 586–8145 or (202) 586–5827. E-mail: *Michael.Kido@hq.doe.gov* or *Eric.Stas@hq.doe.gov*.

SUPPLEMENTARY INFORMATION:

This final rule incorporates by reference into subpart E of Title 10, Code of Federal Regulations, part 431 (10 CFR part 431), the following standard:

- The Hydronics Institute Division of GAMA BTS–2000 Testing Standard, (''HI BTS–2000, Rev06.07''), *Method to Determine Efficiency of Commercial Space Heating Boilers,* Second Edition (Rev 06.07), 2007.

The Gas Appliance Manufacturers Association (GAMA) merged in 2008 with the Air-Conditioning and Refrigeration Institute to become the Air-Conditioning, Heating, and Refrigeration Institute (AHRI). The Hydronics Institute BTS–2000 Testing Standard can be obtained from AHRI. Copies of HI BTS–2000 can be obtained from the Hydronics Institute Section of AHRI, P.O. Box 218, Berkeley Heights, NJ 07922–0218, (866) 408–3831, or go to: *http://www.ahrinet.org/Content/OrderaStandard_573.aspx.*

Table of Contents

I. Summary of Final Rule

The Energy Policy and Conservation Act (42 U.S.C. 6291 *et seq.*), as amended (EPCA), requires DOE to consider amending the existing Federal energy conservation standard for each type of equipment listed (generally, commercial water heaters, commercial packaged boilers, commercial air conditioning and heating equipment, and packaged terminal air conditioners and heat pumps), each time ASHRAE Standard 90.1, *Energy Standard for Buildings Except Low-Rise Residential Buildings* (ASHRAE Standard 90.1 or, in context, 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,[1] DOE must adopt amended energy conservation standards at the new efficiency level in ASHRAE Standard 90.1, unless clear and convincing evidence supports a determination that adoption of a more-stringent efficiency level as a national standard would produce significant additional energy savings and be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)) If DOE decides to adopt as a national standard the efficiency levels specified in the amended ASHRAE Standard 90.1, DOE must establish such standard not later than 18 months after publication of the amended industry standard. (42 U.S.C. 6313(a)(6)(A)(ii)(I)) If DOE determines that a more-stringent standard is appropriate, DOE must establish an amended standard not later than 30 months after publication of the revised ASHRAE Standard 90.1. (42 U.S.C. 6313(a)(6)(B))

DOE published a notice of proposed rulemaking on March 20, 2009 (March 2009 NOPR), in the **Federal Register** describing DOE's determination of scope for considering amended energy conservation standards with respect to certain heating, ventilating, air-conditioning, and water-heating equipment addressed in ASHRAE Standard 90.1–2007. 74 FR 12000; 12008–20. ASHRAE Standard 90.1–2007, which was formally adopted by the group's Board of Directors in early January 2008, generally retained the energy efficiency levels already in place, except with respect to commercial packaged boilers and one class of commercial package air conditioners and heat pumps—water cooled and evaporatively cooled air conditioners and heat pumps with a cooling capacity at or above 240,000 Btu/h and less than 760,000 Btu/h. *See* 74 FR 12004.

For the commercial package air conditioning and heating equipment covered in this rulemaking, ASHRAE assigned an effective date of January 10, 2008. For eight equipment classes of commercial packaged boilers, ASHRAE assigned an effective date of March 2, 2010. For the remaining two equipment classes of commercial packaged boilers covered by this rulemaking, ASHRAE created two-tiered effective dates—March 2, 2010, for an initial increase in the efficiency level and March 2, 2020, for the next required level.

In determining the scope of the rulemaking, DOE is statutorily required to ascertain whether the revised ASHRAE efficiency levels have become more stringent, thereby ensuring that any new amended national standard would not result in "backsliding," which is prohibited under 42 U.S.C. 6295(o)(1) and 42 U.S.C. 6316(a). For those equipment classes for which ASHRAE set more-stringent efficiency levels (*i.e.,* commercial packaged boilers), DOE analyzed the economic and energy savings potential of amended national energy conservation standards (at both the new ASHRAE Standard 90.1 efficiency levels and more-stringent efficiency levels) in the March 2009 NOPR. 74 FR 12037–41.

The energy conservation standards in today's final rule, which apply to all commercial packaged boilers and 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, satisfy all applicable requirements of EPCA and will achieve the maximum improvements in energy efficiency that are technologically feasible and economically justified. (*See* 42 U.S.C. 6316(a); 42 U.S.C. 6295(o)(2)(A)) DOE has concluded that, based on the information presented and its analyses, there is not clear and convincing evidence justifying adoption of more-stringent efficiency levels for this equipment.

Thus, in accordance with the criteria discussed in this notice, DOE is adopting amended energy conservation standards for ten equipment classes of commercial packaged boilers and adopting a new energy conservation standard for 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 by adopting the efficiency levels specified by ASHRAE Standard 90.1–2007. Pursuant to EPCA, the compliance date for amended energy conservation standards based upon the levels in ASHRAE Standard 90.1 is either two or three years after the effective date of the requirement in the amended ASHRAE standard, depending on the type and size of the equipment. (*See* 42 U.S.C. 6313(a)(6)(D)) In the present case, the amended standards for commercial packaged boilers apply to the ten equipment classes of commercial packaged boilers manufactured on or after the date two years after the effective date specified in ASHRAE Standard 90.1–2007. (42 U.S.C. 6313(a)(6)(D)(i)) The amended standards for 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 apply to such equipment manufactured on or after the date three years after the effective date specified in ASHRAE Standard 90.1–2007. (42 U.S.C. 6313(a)(6)(D)(ii)) Table I.1 shows the energy conservation standards that DOE

[1] 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 explained that the statutory trigger requiring DOE to adopt uniform national standards based on ASHRAE action is the amending of an efficiency level by ASHRAE for any of the equipment listed in EPCA section 342(a)(6)(A)(i) (42 U.S.C. 6313(a)(6)(A)(i)) by increasing the energy efficiency level for that equipment type. *Id.* at 10042. In other words, if the revised ASHRAE Standard 90.1 leaves the standard level unchanged or lowers the standard, as compared to the level specified by the national standard adopted pursuant to EPCA, DOE does not have the authority to conduct a rulemaking to consider a higher standard for that equipment pursuant to 42 U.S.C. 6313(a)(6)(A).

is adopting today and their respective effective dates.

BILLING CODE 6450–01–P

Table I.1. Current and Amended Federal Energy Conservation Standards for Specific Types of Commercial Equipment

ASHRAE Equipment Class	Federal Energy Conservation Standards	Amended Federal Energy Conservation Standards	
		Energy-Efficiency Levels	Effective Date
Commercial Package Air-Conditioning and Heating Equipment			
Water-Cooled and Evaporatively Cooled Air Conditioner with Cooling Capacity ≥240,000 Btu/h and <760,000 Btu/h with No Heating or with Electric Resistance Heating*	None	11.0 EER**	1/10/2011
Water-Cooled and Evaporatively Cooled Air Conditioner with Cooling Capacity ≥240,000 Btu/h and <760,000 Btu/h with Heating That is Other Than Electric Resistance Heating	None	10.8 EER	1/10/2011
Commercial Packaged Boilers			
Small Gas-Fired, Hot Water, Commercial Packaged Boilers	E_C = 80%	E_T = 80%	3/2/2012
Small Gas-Fired, Steam, All Except Natural Draft Commercial Packaged Boilers	E_C = 80%	E_T = 79%	3/2/2012
Small Gas-Fired, Steam, Natural Draft, Commercial Packaged Boilers	E_C = 80%	E_T = 77% E_T = 79%	3/2/2012 3/2/2022
Small Oil-Fired, Hot Water, Commercial Packaged Boilers	E_C = 83%	E_T = 82%	3/2/2012
Small Oil-Fired, Steam, Commercial Packaged Boilers	E_C = 83%	E_T = 81%	3/2/2012
Large Gas-Fired, Hot Water, Commercial Packaged Boilers	E_C = 80%	E_C = 82%	3/2/2012
Large Gas-Fired, Steam, All Except Natural Draft, Boilers	E_C = 80%	E_T = 79%	3/2/2012
Large Gas-Fired, Steam, Natural Draft, Commercial Packaged Boilers	E_C = 80%	E_T = 77% E_T = 79%	3/2/2012 3/2/2022
Large Oil-Fired, Hot Water, Commercial Packaged Boilers	E_C = 83%	E_C = 84%	3/2/2012
Large Oil-Fired, Steam, Commercial Packaged Boilers	E_C = 83%	E_T = 81%	3/2/2012

* British thermal units per hour (Btu/h).
** Energy efficiency ratio.

BILLING CODE 6450–01–C

In addition, DOE is adopting amendments to its test procedures for commercial packaged boilers, which manufacturers are required to use to certify compliance with energy conservation standards mandated under EPCA. See 42 U.S.C. 6314(a)(4) and 10 CFR part 431.86. Specifically, these amendments, which were proposed in the March 2009 NOPR, update the citations and references to the most recent version of the industry standards already referenced in DOE's test procedures. 74 FR 12020–22. In addition, these amendments specify a definition and methodology to test the thermal efficiency of these boilers, which is the metric DOE is adopting for eight of the ten equipment classes of commercial packaged boilers to conform with the new energy efficiency metric adopted in ASHRAE Standard 90.1–2007. Lastly, these amendments make a small number of technical modifications to DOE's existing test procedure for commercial packaged boilers, including deleting obsolete references and renumbering appropriate sections of the CFR.

II. Introduction

A. Authority

Title III of EPCA, Public Law 94–163, as amended, sets forth a variety of provisions concerning energy efficiency. Part A–1 [2] 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

[2] For editorial reasons, Parts B (consumer products) and C (commercial equipment) of Title III of EPCA were redesignated as Parts A and A–1, respectively, in the United States Code.

commercial and industrial equipment. Part A–1 specifically includes definitions (42 U.S.C. 6311), energy conservation standards (42 U.S.C. 6313), test procedures (42 U.S.C. 6314), labeling provisions (42 U.S.C. 6315), and the authority to require information and reports from manufacturers (42 U.S.C. 6316).

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 packaged 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, 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).

Congress further directed DOE to consider amending the existing Federal energy conservation standard for each type of equipment listed whenever ASHRAE amends the efficiency levels in Standard 90.1. (42 U.S.C. 6313(a)(6)(A)) For each type of listed equipment, EPCA directs that if ASHRAE amends Standard 90.1, DOE must adopt amended standards at the new ASHRAE efficiency level unless clear and convincing evidence supports a determination that adoption of a more stringent level would produce significant additional energy savings and would 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 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 it 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))

ASHRAE officially released and made public on January 10, 2008, ASHRAE Standard 90.1–2007. This action triggered DOE's obligations under 42 U.S.C. 6313(a)(6), as outlined above.

Pertinent to any rulemaking in response to an ASHRAE revision of Standard 90.1, DOE must evaluate the amended efficiency levels to ensure that the adoption of the revised Standard 90.1 levels does not result in the promulgation of any amended standard that either increases the maximum allowable energy use or decreases the minimum required energy efficiency of covered equipment. (42 U.S.C. 6295(o)(1); 42 U.S.C. 6316(a)) This "anti-backsliding" provision acts as a statutory backstop to help preserve the stringency of established DOE energy efficiency standards. *See Natural Resources Defense Council* v. *Abraham,* 355 F.3d 179 (2d Cir. 2004).

When considering the possibility of a more-stringent standard, EPCA requires DOE to consider a variety of factors, with the primary ones being whether a more-stringent standard would be technologically feasible, economically justified, and be likely to produce significant additional energy savings. For example, EPCA provides that in deciding whether such a standard is economically justified, DOE must determine, after receiving comments on the proposed standard, whether the benefits of the standard exceed its burdens by considering, to the greatest extent practicable, the following seven factors:

1. The economic impact of the standard on manufacturers and consumers of the products subject to the standard;
2. The savings in operating costs throughout the estimated average life of the product in the type (or class) compared to any increase in the price of, or in the initial charges for, or maintenance expenses of the products which are likely to result from the imposition of the standard;
3. The total projected amount of energy savings likely to result directly from the imposition of the standard;
4. Any lessening of the utility or the performance of the products likely to result from the imposition of the standard;
5. The impact of any lessening of competition, as determined in writing by the Attorney General, that is likely to result from the imposition of the standard;
6. The need for national energy conservation; and
7. Other factors the Secretary considers relevant.

(42 U.S.C. 6295(o)(2)(B)(i)–(ii); 42 U.S.C. 6316(a))

Additionally, the Secretary may not prescribe an amended standard if interested persons have established by a preponderance of the 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, 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. 6295(o)(4); 42 U.S.C. 6316(a))

Federal energy conservation requirements for commercial equipment generally supersede State laws or regulations concerning energy conservation testing, labeling, and standards. (42 U.S.C. 6316(a)–(b)) However, DOE can grant waivers of preemption for particular State laws or regulations, in accordance with section 327(d) of EPCA. (42 U.S.C. 6297(d) and 6316(b)(2)(D))

When considering more stringent standards for the ASHRAE equipment under consideration here, EPCA states, in relevant part, that there is a rebuttable presumption that an energy conservation standard is economically justified if the additional cost to the consumer of a product that meets the standard level is less than three times the value of the first-year energy (and, as applicable, water) savings resulting from the standard, as calculated under the applicable DOE test procedure. (42 U.S.C. 6295(o)(2)(B)(iii) and 42 U.S.C. 6316(a)) Generally, DOE's life cycle cost (LCC) and payback period (PBP) analyses generate values that calculate the payback period for consumers of potential energy conservation standards, which includes, but is not limited to, the three-year payback period contemplated under the rebuttable presumption test discussed above. However, DOE routinely conducts a full economic analysis that considers the full range of impacts, including those to the consumer, manufacturer, Nation, and environment, as required under 42 U.S.C. 6295(o)(2)(B)(i) and 42 U.S.C. 6316(a). The results of this analysis serve as the basis for DOE to definitively evaluate the economic justification for a potential standard level (thereby supporting or rebutting the results of any preliminary determination of economic justification).

B. Background

1. ASHRAE Standard 90.1–2007

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. ASHRAE Standard 90.1 addresses efficiency levels for many types of commercial heating, ventilating, air-conditioning (HVAC), and water-heating equipment covered by EPCA; it revised the efficiency levels for certain commercial equipment, while leaving in place the preexisting efficiency levels for the remaining equipment. For the equipment classes where ASHRAE left the preexisting efficiency in place, the efficiency levels specified in ASHRAE Standard 90.1–1999 were carried forward and continue to apply.[3]

Table II.1 below shows the current Federal energy conservation standards and the new efficiency levels for equipment affected by the changes made by ASHRAE Standard 90.1–2007. In section IV of the March 2009 NOPR, DOE assessed these equipment types to determine whether the ASHRAE amendments constitute increased energy conservation levels that would necessitate further analysis. 74 FR 12008–20. This step was necessary because DOE found that while ASHRAE had made changes in ASHRAE Standard 90.1–2007, it was not immediately apparent whether these changes to the energy efficiency levels would make the equipment more or less efficient, when 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. However, it is not immediately clear whether this modified level will result in increased or reduced efficiency. Therefore, DOE undertook this additional threshold analysis to thoroughly evaluate the amendments in ASHRAE Standard 90.1–2007 in a manner consistent with its statutory mandate.

BILLING CODE 6450–01–P

[3] DOE reviewed and adopted some of the efficiency levels in ASHRAE Standard 90.1–1999 in a Final Rule published on January 12, 2001. 66 FR 3336.

Table II.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	ASHRAE Standard 90.1-2007	
		Energy Efficiency Levels	Effective Date
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‡
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‡
Commercial Package Air-Conditioning and Heating Equipment			
Through-the-Wall Air Conditioners	13.0 SEER*** (Effective as of 06/19/08)	12.0 SEER	1/23/2010
Through-the-Wall Air-Cooled Heat Pumps	13.0 SEER (Effective as of 06/19/08)	12.0 SEER 7.4 HSPF†	1/23/2010
Small Duct, High Velocity, Air-Cooled Air Conditioners	13.0 SEER (Effective as of 06/19/08)	10.0 SEER	1/10/2008
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
Package Air-Cooled Air Conditioners with Cooling Capacity ≥760,000 Btu/h†† and with No Heating or with Electric Resistance Heating	None	9.7 EER†††	1/1/2010
Package 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	1/1/2010
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‡
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‡
Water-Cooled and Evaporatively Cooled Air	None	11.0 EER	1/10/2008‡

ASHRAE Equipment Class	Federal Energy Conservation Standards	ASHRAE Standard 90.1-2007	
		Energy Efficiency Levels	Effective Date
Conditioner with Cooling Capacity ≥240,000 Btu/h and with No Heating or with Electric Resistance Heating			
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‡
Commercial Packaged Boilers			
Small Gas-Fired, Hot Water, Commercial Packaged Boilers	$E_C = 80\%$	$E_T = 80\%$	3/2/2010
Small Gas-Fired, Steam, All Except Natural Draft Commercial Packaged Boilers	$E_C = 80\%$	$E_T = 79\%$	3/2/2010
Small Gas-Fired, Steam, Natural Draft, Commercial Packaged Boilers	$E_C = 80\%$	$E_T = 77\%$ $E_T = 79\%$	3/2/2010 3/2/2020
Small Oil-Fired, Hot Water, Commercial Packaged Boilers	$E_C = 83\%$	$E_T = 82\%$	3/2/2010
Small Oil-Fired, Steam, Commercial Packaged Boilers	$E_C = 83\%$	$E_T = 81\%$	3/2/2010
Large Gas-Fired, Hot Water, Commercial Packaged Boilers	$E_C = 80\%$	$E_C = 82\%$	3/2/2010
Large Gas-Fired, Steam, All Except Natural Draft, Boilers	$E_C = 80\%$	$E_T = 79\%$	3/2/2010
Large Gas-Fired, Steam, Natural Draft, Commercial Packaged Boilers	$E_C = 80\%$	$E_T = 77\%$ $E_T = 79\%$	3/2/2010 3/2/2020
Large Oil-Fired, Hot Water, Commercial Packaged Boilers	$E_C = 83\%$	$E_C = 84\%$	3/2/2010
Large Oil-Fired, Steam, Commercial Packaged Boilers	$E_C = 83\%$	$E_T = 81\%$	3/2/2010

*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 III of the March 2009 NOPR. 74 FR 12008-20.

**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 final rule, 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.

BILLING CODE 6450–01–C

2. Notice of Data Availability and Request for Public Comment

On July 16, 2008, DOE published a notice of data availability (July 2008 NODA) and request for public comment in the **Federal Register** 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. 73 FR 40770 (July 16, 2008). Specifically, the July 2008 NODA presented for public comment DOE's analysis of the potential energy savings estimates for amended national energy conservation standards for types of commercial equipment based on: (1) the modified efficiency levels contained within ASHRAE Standard 90.1–2007; and (2) more-stringent efficiency levels. 73 FR 40772. DOE has described these analyses and preliminary conclusions and sought input from interested parties, including the submission of data and other relevant information. *Id.*

In addition, DOE discussed the changes introduced by Standard 90.1–2007 and presented an initial description of DOE's evaluation of each ASHRAE equipment type to determine which energy conservation standards, if any, have been set pursuant to EPCA, in order for DOE to determine whether the amendments in ASHRAE Standard 90.1–2007 result in increased efficiency levels when compared with the current Federal standards. 74 FR 40776–86. Regarding equipment for which ASHRAE increased efficiency levels through Standard 90.1–2007, DOE subjected these equipment efficiency levels to the potential energy savings analysis discussed above and presented the results for public comment. *Id.*

As a result of the preliminary determination of scope set forth in the July 2008 NODA, DOE found that the ten equipment classes of commercial packaged boilers described by ASHRAE were the only equipment type available on the market for which ASHRAE increased the efficiency levels. *Id.* DOE presented its methodology, data, and results for the preliminary energy savings analysis developed for most of the commercial packaged boiler equipment classes in the July 2008 NODA for public comment. 72 FR 40786–91.

3. Notice of Proposed Rulemaking

On March 20, 2009, DOE published a NOPR in the **Federal Register** proposing to amend the energy conservation standards for ten equipment classes of commercial packaged boilers and to adopt a new energy conservation standard for water-cooled and evaporatively-cooled commercial packaged air conditioners and heat pumps with a cooling capacity at or above 240,000 Btu/h and less than 760,000 Btu/h by adopting the efficiency levels specified by ASHRAE Standard 90.1–2007. 74 FR 12000.

The March 2009 NOPR also contained DOE's determination of scope for consideration of amended energy conservation standards with respect to certain heating, ventilating, air-conditioning, and water-heating equipment addressed in ASHRAE Standard 90.1–2007 and shown in Table II.1, above. 74 FR 12008–20. For commercial packaged boilers, DOE analyzed the economic and energy savings potential of amended national energy conservation standards (at both the new ASHRAE Standard 90.1 efficiency levels and more stringent efficiency levels). *See* generally 74 FR 12020–41. DOE also explained in the March 2009 NOPR that it did not analyze the economic and energy savings potential of amended national energy conservation standards for water-cooled and evaporatively cooled commercial packaged air conditioners and heat pumps with a cooling capacity at or above 240,000 Btu/h and less than 760,000 Btu/h because there is no equipment currently being manufactured in this equipment class. 74 FR 12013.

In addition, DOE proposed amendments to its test procedures for commercial packaged boilers to update the citations and references to the most recent version of the industry standards already referenced in DOE's test procedures. 74 FR 12020–22. DOE also proposed to add a definition and methodology to test the thermal efficiency for eight of the ten equipment classes of commercial packaged boilers, which was the metric DOE had proposed. *Id.*

4. Notice of Data Availability and Request for Public Comment—Environmental Assessment and Emissions Monetization

On June 3, 2009, DOE published a NODA and request for public comment on the environmental assessment (EA) for the March 2009 NOPR proposing amended energy conservation standards for commercial packaged boilers and 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. 74 FR 26596. The EA included a concise examination of the impacts of emission reductions likely to result from the proposed standards for these two equipment types, as presented in Chapter 8 of the NOPR TSD. DOE also performed an emissions monetization analysis of those potential emission reductions and described the results of the monetization analysis in Chapter 9 of the NOPR TSD. *Id. See http://www1.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/ch_8_ashrae_nopr_tsd.pdf* for the EA and *http://www1.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/ch_9_ashrae_nopr_tsd.pdf* for the monetization analysis. DOE received no comments on the EA or the emissions monetization analysis described by the June 2009 NODA. 74 FR 26596.

III. General Discussion of Comments Regarding the March 2009 NOPR, the ASHRAE Process, and DOE's Interpretation of EPCA's Requirements With Respect to ASHRAE Equipment

In response to the March 2009 NOPR, DOE received three comments from manufacturers, trade associations, and energy efficiency advocates. In addition, DOE received a comment from the U.S. Department of Justice (DOJ) regarding the potential impact on competition of proposed amended energy conservation standards for commercial packaged boilers and certain commercial package air-conditions and heat pumps. The issues raised in these comments, along with DOE's responses, are set forth below.

A. Equipment Classes With a Two-Tier Efficiency Level Specified in ASHRAE Standard 90.1–2007

For commercial packaged boilers, ASHRAE Standard 90.1–2007 further divides the existing equipment classes (*i.e.,* gas-fired and oil-fired) into 10 different categories. For two of the ten categories specified in ASHRAE Standard 90.1–2007, ASHRAE specifies a two-tier efficiency level, with one efficiency level effective in 2010 and another more-stringent efficiency level effective in 2020. The two categories where ASHRAE Standard 90.1–2007 specifies a two-tier efficiency levels are small gas-fired steam natural draft and large gas-fired steam natural draft commercial packaged boilers.

In response to DOE's proposal for small gas-fired steam natural draft and large gas-fired steam natural draft commercial packaged boilers, several parties commented during the public meeting regarding the adoption of two-tiered efficiency levels. The American Council for an Energy-Efficient Economy (ACEEE) asserted that for a rulemaking with an effective date of March 2, 2012, it is inappropriate for

DOE to pre-ordain any standards with an effective date of March 2, 2022. (ACEEE, Public Meeting Transcript, No. 12 at pp. 100–102)[4] ACEEE further stated that it could not see any reason why DOE would choose to bind itself today to any standards in 2022 and that in doing so, the dynamic at ASHRAE would likely be influenced by DOE's actions. (ACEEE, Public Meeting Transcript, No. 12 at p. 104) Lastly, ACEEE stated it did not believe the second-tier efficiency level was the subject of any ASHRAE discussions. (ACEEE, Public Meeting Transcript, No. 12 at pp. 100–102)

The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) asserted that for steam natural draft commercial packaged boilers, it is worth having a second standard level with an effective date of March 2, 2022. (AHRI, Public Meeting Transcript, No. 12 at pp. 102–103) Contrary to ACEEE's assertion, AHRI stated that the delayed effective date (*i.e.,* the second tier) was a part of the ASHRAE discussions and the purpose of this two-tiered approach was to make an initial incremental efficiency change while allowing for a longer lead time for a larger improvement in efficiency for this very small segment of the market. According to AHRI, the delayed date was to put manufacturers of these products on notice that in 10 years the steam natural draft equipment must be as efficient as non-natural draft equipment. (AHRI, Public Meeting Transcript, No. 12 at pp. 102–103)

Burnham Hydronics Institute (Burnham) asserted that the proposed levels for these two equipment classes are going to result in energy savings through boilers being modified or taken off the market. (Burnham, Public Meeting Transcript, No. 12 at pp. 103–104) Burnham also predicted that natural gas steam natural draft products will be essentially eliminated in 2022 due to the second-tier requirements in ASHRAE Standard 90.1–2007. Burnham stated that manufacturers of these products received additional time because some applications (*e.g.,* boiler rooms with low head room) have no currently available alternatives. Burnham stated that the extra 10 years affords manufacturers and owners of buildings time to decide how to handle those potential issues and to develop an alternative. (Burnham, Public Meeting Transcript, No. 12 at pp. 103–104)

DOE is adopting the two-tier efficiency levels in ASHRAE Standard 90.1–2007 in today's final rule for small gas-fired steam natural draft and large gas-fired steam natural draft commercial packaged boilers. EPCA requires DOE to adopt energy efficiency standards for this equipment at the minimum level specified in any amended ASHRAE standard unless more-stringent standards are supported by clear and convincing evidence. (42 U.S.C. 6313(a)(6)(A)) Unless more-stringent standards are appropriate (in which case DOE can use its judgment to tailor the relevant standard level(s)), the statute does not provide DOE latitude to alter or disregard the ASHRAE Standard 90.1 levels in whole or part. Because ASHRAE adopted a tiered standard, DOE cannot adopt one efficiency level without adopting the latter efficiency level. Accordingly, in its economic and energy savings analysis, DOE analyzed these two equipment classes as if both the 2010 and 2020 levels will be adopted on their respective effective dates. In addition, DOE is adopting the two-tier efficiency levels in ASHRAE Standard 90.1–2007 as a ''package'' in today's final rule for small gas-fired steam natural draft and large gas-fired steam natural draft commercial packaged boilers.

B. The Definition of Amendment With Respect to the Efficiency Levels in an ASHRAE Standard

As DOE noted in the July 2008 NODA (73 FR 40771) and the March 2009 NOPR (74 FR 12006), EPCA does not explicitly define the term ''amended'' in the context of ASHRAE Standard 90.1. DOE had previously interpreted what would constitute an ''amended standard'' in the context of ASHRAE equipment in a final rule published in the **Federal Register** on March 7, 2007 (72 FR 10038). In that final rule, DOE explained that when ASHRAE increases the efficiency level for any of the equipment specified in EPCA section 342(a)(6)(A)(i) vis-á-vis the current DOE standards, that action triggers the requirement for DOE to consider adoption of uniform national standards based on these changes. 72 FR 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). 73 FR 40771.

In response to DOE's interpretation of the definition of ''amendment,'' the Appliance Standards Awareness Project (ASAP), ACEEE, the Alliance to Save Energy (ASE), the Natural Resources Defense Council (NRDC), the Northeast Energy Efficiency Partnership (NEEP), and the Northwest Power and Conservation Council (NPCC) submitted a joint comment, referred to as ''the Joint Comment,'' disagreeing with DOE's position in the March 2009 NOPR. (The Joint Comment, No. 19 at p. 1) Specifically, the Joint Comment argued that DOE acknowledges that the ASHRAE standards for several products have been revised relative to earlier versions. However, the Joint Comment pointed out that DOE takes an improperly constrained view of the meaning of ''amended,'' arbitrarily ruling out changes such as addition of prescriptive requirements, changes in metric and decreases in the standard. The Joint Comment referred to its earlier comments in response to the July 2008 NODA (*i.e.,* the Advocacy Joint Comment, No. 4) for additional detail and asserted that any of these changes fit within the meaning of ''amended'' and should be considered as changes requiring DOE review. The Joint Comment stated its belief that DOE has applied an unlawfully narrow definition to the word ''amendment.'' (The Joint Comment, No. 19 at p. 1)

DOE continues to view the statute's trigger as tied to an increased energy efficiency level for the affected equipment type. As described in the March 2007 final rule and the March 2009 NOPR, section 342 of EPCA requires DOE to establish energy conservation standards for the commercial equipment contained in this rulemaking at the minimum efficiency level specified in any amended ASHRAE standard unless more stringent standards are supported by clear and convincing evidence—in other words, to maintain uniform national standards consistent with those set in ASHRAE Standard 90.1 unless more stringent standards are justified. 72 FR 10042 and 74 FR 12006. Therefore, if ASHRAE has not amended a standard for a product subject to section 342, there is no change that would require action by DOE to consider amending the uniform national standard to maintain consistency with ASHRAE Standard 90.1. *Id.* If ASHRAE considered amending the standards for a given equipment type but ultimately chose not to do so, the statutory requirement that DOE adopt ASHRAE's amended

[4] ''ACEEE, Public Meeting Transcript, No. 12 at pp. 100–102'' refers to (1) to a statement that was submitted by the American Council for an Energy-Efficient Economy during the March 2009 NOPR Public Meeting. It was recorded in the Resource Room of the Building Technologies Program in the docket under ''Energy Conservation Program for Certain Industrial Equipment: Energy Conservation Standards for Commercial Heating, Air-Conditioning, and Water-Heating Equipment,'' Docket Number EERE–2008–BT–STD–0013, as comment number 12; and (2) a passage that appears on pages 100 through 102 of that statement.

standards is not triggered with respect to this equipment. *Id.* The statutory language specifically links ASHRAE's action to amend efficiency levels for specific equipment to DOE's action affecting the same equipment. *Id.* Given this statutory scheme, DOE does not agree with the Joint Comment's suggestion that amendment of the level for any ASHRAE product opens up the national standards for all ASHRAE products to potential amendment.

C. DOE's Review of ASHRAE Equipment Independent of the ASHRAE Standards Process

The Joint Comment asserted that the routine review of efficiency standards required by the Energy Independence and Security Act of 2007 (EISA 2007), Public Law 110–140, (*i.e.,* section 305(b) of EISA 2007) clearly intends to establish a structure to review each DOE standard for ASHRAE covered equipment at least every six years. (The Joint Comment, No. 19 at pp. 1–2) The Joint Comment pointed out that several ASHRAE standards were last reviewed in 2001, including commercial water heaters and commercial furnaces. In the March 2009 NOPR, DOE maintained that reviews are not due for products for which the six-year clock has expired prior to enactment of EISA 2007. However, the commenters view such an interpretation as sheltering these products from further review by ASHRAE on an indefinite basis. According to the commenters, the intent of EISA 2007 was to subject all standards to regular reviews, not to create a haphazard special class with a potentially permanent exception from periodic DOE review. The Joint Comment took the position that DOE can rectify this situation by initiating a review of all ASHRAE standards that have not been changed in more than six years (*e.g.,* commercial furnaces, commercial water heaters). The Joint Comment argued that DOE must do so under the EISA 2007 provision. At a minimum, the Joint Comment asserted that DOE should conduct an initial analysis to assess potential energy savings from a full-fledged review of product standards, which have not been updated since the January 2001 final rule (66 FR 3336). (The Joint Comment, No. 19 at pp. 1–2)

In response, DOE acknowledges that section 305(b) of EISA 2007 amended section 342(a)(6) of EPCA by directing DOE to assess whether there is a need to update the Federal energy conservation standards for certain commercial equipment (*i.e.,* ASHRAE equipment) after a certain amount of time has elapsed. The section states that the Secretary must publish either a notice of determination that standards for a product do not need to be amended, or a notice of proposed rulemaking including amended proposed standards within 6 years after the issuance of any final rule establishing or amending a standard. (42 U.S.C. 6313(a)(6)(C)(i)) In addition, if the Secretary chooses to publish a notice of determination that the standards for a product do not need to be amended, a new determination must be issued within 3 years of the previous determination. (42 U.S.C. 6313(a)(6)(C)(iii)(II)) These requirements are applicable to small commercial package air conditioning and heating equipment, large commercial package air conditioning and heating equipment, very large commercial package air conditioning and heating equipment, packaged terminal air conditioners, packaged terminal heat pumps, warm-air furnaces, packaged boilers, storage water heaters, instantaneous water heaters, and unfired hot water storage tanks. (42 U.S.C. 6313(a)(6)(A)(i))

DOE believes that the commenters have misconstrued the amendments in section 305(b) of EISA 2007 by suggesting that the relevant provisions should be applied retroactively, rather than prospectively. As stated previously, 74 FR 12007, DOE does not believe Congress intended to apply these requirements retroactively, which would cause DOE to be in immediate violation of its legal obligations upon passage of the statute, thereby failing from its inception. DOE does not agree with the assertion that DOE is late and should initiate an immediate review of certain commercial equipment cited by the commenters above.

D. Combination Efficiency Level and Design Requirements in ASHRAE Standard 90.1–2007

For several classes of equipment, ASHRAE added design requirements in addition to the efficiency level requirements in ASHRAE Standard 90.1. For example, 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.[5] DOE stated in the March 2009 NOPR that the language of EPCA authorizes DOE to establish a performance standard or a single design standard for certain types of commercial equipment, including oil-fired furnaces. 74 FR 12008–09.

The Joint Comment argued that rejecting multi-metric standards reversed a prior position adopted by DOE in the central air conditioner rulemaking. (The Joint Comment, No. 19 at p. 2) The Joint Comment strongly urged the new Administration to reconsider this policy because multi-metric standards are increasingly important for capturing cost-effective energy savings. It argued that ASHRAE found that such standards made sense for commercial furnaces and criticized DOE for not considering the ASHRAE changes. The Joint Comment stated that energy use for many products can be moderated through controls strategies, which are often not represented in a product's test method. (The Joint Comment, No. 19 at p. 2)

On that point, ASHRAE recommended that DOE consider the role of prescriptive requirements in the setting of national efficiency levels for commercial furnaces. (ASHRAE, No. FDMS DRAFT 5.1 at p. 2) ASHRAE commented that these prescriptive requirements provide critical characterizations of overall equipment efficiency and total energy use. According to ASHRAE, these requirements are designed to work in cooperation with the numerical efficiency metric to achieve greater levels of energy efficiency than possible through the use of the numerical metric alone. ASHRAE asserted that as it continues to develop Standard 90.1 and to decrease the total energy use associated with that standard, such additional prescriptive requirements likely will become even more prevalent. It argued that increasing the stringency of Standard 90.1 will require greater focus on systems as a whole and consideration of all factors and attributes that contribute to the energy use associated with that system. In order to achieve the maximum energy efficiency envisioned by the standard, ASHRAE strongly encouraged DOE to reconsider its policy of not including accompanying prescriptive requirements in its energy conservation analysis. (ASHRAE, No. FDMS DRAFT 5.1 at p. 2)

DOE notes that its response to this issue is grounded in the requirements of EPCA, not DOE policy, and that the commenters offered no other plausible alternative reading of this statutory provision. In this rulemaking, DOE only reviewed the combination efficiency

[5] "Jacket losses" refer generally to the heat loss to the surroundings from the furnace, excluding flue losses.

level and design requirements for gas-fired and oil-fired commercial warm air furnaces because these were the only equipment classes where DOE's initial review of the efficiency levels in ASHRAE Standard 90.1–2007 for this equipment revealed a perceived change when compared to the Federal energy conservation standards for this equipment. As described in the March 2009 NOPR, DOE has determined that the design requirements in ASHRAE Standard 90.1–2007 for gas-fired and oil-fired commercial warm air furnaces are beyond the scope of its legal authority. 74 FR 12008–10. More specifically, the language of EPCA authorizes DOE to establish ''energy conservation standards'' that set either a single performance standard or a single design requirement—not both. *See* 42 U.S.C. 6311(18). As such, a standard that establishes both a performance standard and a design requirement is beyond the scope of DOE's legal authority, as would be a standard that included more than one design requirement. In this case, ASHRAE Standard 90.1–2007 recommends three design requirements. Thus, if DOE were to replace its existing, performance-based standard with a design requirement, the statute would not permit adoption of all three design requirements in ASHRAE Standard 90.1–2007. Furthermore, such a change would also necessitate an initial DOE determination that the new requirement would not result in backsliding when compared to the current standards.

E. The Proposed Energy Conservation Standards for Commercial Packaged Boilers

In the March 2009 NOPR, DOE proposed the efficiency levels in ASHRAE Standard 90.1–2007 for the ten classes of commercial packaged boilers. 74 FR 12002. DOE received four comments in response to its proposal for commercial packaged boilers. Specifically, the Joint Comment stated its support for DOE's proposal on commercial packaged boilers. (The Joint Comment, No. 19 at p. 1) Burnham also stated its support for DOE's direction in the NOPR and urged DOE to issue a final rule as soon as possible. (Burnham, Public Meeting Transcript, No. 12 at p. 96) AHRI stated that it agrees with DOE's direction in the NOPR and pointed out that there is a ''residual value'' in transitioning from the combustion efficiency metric to the thermal efficiency metric for commercial packaged boilers. (AHRI, Public Meeting Transcript, No. 12 at pp. 97–98) ASHRAE commended DOE for its proposed handling of commercial packaged boilers in the March 2009 NOPR. ASHRAE pointed out consensus agreements between manufacturers and energy-efficiency advocates provide a valuable means of improving energy efficiency with necessary consideration for technological and economic feasibility, as DOE has acknowledged. (ASHRAE, No. FDMS DRAFT 5.1 at p. 1)

Lastly, DOJ concluded that the proposed standards for commercial packaged boilers are not likely to have an adverse effect on competition. (DOJ, No. 15 at p. 2) In reaching this conclusion, DOJ noted the absence of any competitive concerns raised by industry participants at the public meeting. In addition, DOJ noted the efficiency levels in the proposed standards are based on a consensus recommendation submitted to ASHRAE by efficiency advocacy groups and the trade association for manufacturers of commercial packaged boilers. Based on these facts, DOJ stated its belief that the new standard would not likely reduce competition. *Id.*

F. Commercial Electric Instantaneous Water Heaters

SEISCO INTERNATIONAL (SEISCO) commented that it has been (and would continue to be) significantly adversely affected by DOE's decisions not to create a product class for electric tankless water heaters having an output rated greater than 12 kilowatts, as well as to exclude the advanced electric tankless and electric resistance storage tank from the ENERGY STAR program. (SEISCO, No. 17 at p. 1) SEISCO's comments asserted that this type of equipment would provide energy savings benefits when compared to traditional storage-type water heaters. (SEISCO, No. 17 at p. 8)

While DOE acknowledges SEISCO's concerns with regard to the product classes for electric tankless water heaters, these concerns are beyond the scope of this rulemaking. Currently, ASHRAE Standard 90.1 does not include an efficiency level or a prescriptive requirement for commercial electric tankless water heaters. In order for DOE to consider amendments, ASHRAE must amend Standard 90.1 to add test procedures and efficiency levels for these equipment types. In addition, DOE notes that it is not addressing SEISCO's concerns regarding the ENERGY STAR program for electric tankless and electric resistance storage water heaters because it is not part of the ASHRAE rulemaking process.

IV. General Discussion of the Changes in ASHRAE Standard 90.1–2007 and Determination of Scope for Further Rulemaking Analyses

As discussed above, before beginning an analysis of economic impacts and energy savings that would result from adopting the efficiency levels specified by ASHRAE Standard 90.1–2007 or more-stringent efficiency levels, DOE first sought to determine whether the amended Standard 90.1 efficiency levels represented an increase in efficiency above the current Federal standard levels. DOE discussed each equipment class where these levels differ from the current Federal standard level, along with DOE's preliminary conclusion as to the action DOE would take with respect to that equipment in the March 2009 NOPR. *See* 74 FR 12008–20. DOE tentatively concluded from this analysis that the only efficiency levels that represented an increase in efficiency above the current Federal standards were those for certain classes of commercial packaged boilers and 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. For a more detailed discussion of this approach, readers should refer to the preamble to the March 2009 NOPR. *See Id.* DOE received no additional comments on this topic in response to the March 2009 NOPR, so DOE is using the same approach in this final rule.

V. Methodology and Discussion of Comments for Commercial Packaged Boilers

This section provides a brief overview of the analyses DOE has performed for this rulemaking with respect to commercial packaged boilers and the comments received in response to the March 2009 NOPR. A separate subsection addresses each analysis and its respective comments. DOE used a spreadsheet to calculate the LCCs and PBPs of potential amended energy conservation standards. DOE used another spreadsheet to provide shipments forecasts and then calculate national energy savings and net present value impacts of potential amended energy conservation standards.

This section also briefly describes the amendments to the DOE test procedure for commercial packaged boilers to require testing in terms of thermal efficiency, consistent with the amended efficiency levels in ASHRAE Standard 90.1–2007. DOE described all of the test procedure changes it is adopting in today's final rule in the March 2009 NOPR. *See* 74 FR 12020–22.

A. Test Procedures

Section 343(a) of EPCA (42 U.S.C. 6314(a)) requires the Secretary to amend the test procedures for packaged boilers to be the latest version generally accepted by industry or the rating procedures developed or recognized by the Air-Conditioning and Refrigeration Institute (ARI)[6] or by ASHRAE, as referenced by ASHRAE/IESNA Standard 90.1, unless the Secretary determines by clear and convincing evidence that the latest version of the industry test procedure: (1) Is not reasonably designed to produce results reflecting energy efficiency, energy use, and estimated operating costs and (2) would be unduly burdensome to conduct. Additionally, if the procedure is one used for determining estimated annual operating costs, the procedure must provide that the costs are calculated from energy use measurements in a representative average use cycle and from representative average unit costs of the energy needed to operate the equipment during the cycle. (42 U.S.C. 6314(a)(4)(B) and 42 U.S.C. 6314(a)(3)) DOE published a final rule on October 21, 2004, that amended its test procedure for commercial packaged boilers to incorporate by reference the industry test procedure for commercial packaged boilers, the Hydronics Institute (HI) division of the Gas Appliance Manufacturer's Association (GAMA) Boiler Testing Standard BTS–2000, ''Method to Determine the Efficiency of Commercial Space Heating Boilers'' (HI BTS–2000). 69 FR 61949. This rulemaking responded to ASHRAE's action in ASHRAE Standard 90.1–1999 to revise the test procedures for certain commercial equipment, including commercial packaged boilers.

In 2007, AHRI made several changes to BTS–2000 (Testing Standard for Commercial Space Heating Boilers) and reaffirmed the continued use of BTS–2000 (Rev 06.07) as the recommended testing standard. As noted in the NOPR, DOE believes the revised BTS–2000 (Rev 06.07) is reasonably designed to produce results reflecting energy efficiency, energy use, and estimated operating costs, and is not unduly burdensome to conduct. 74 FR 12020. Therefore, DOE is amending the uniform test procedure for commercial packaged boilers to incorporate by reference HI BTS–2000 (Rev 06.07). In addition, for the reasons described in the NOPR, DOE is removing the incorporation by reference of, and any references to, the American Society of Mechanical Engineers (ASME) Power Test Codes for Steam Generating Units, ASME PTC 4.1–1964, reaffirmed 1991 (including 1968 and 1969 addenda) (ASME PTC 4.1) as an alternate test method for rating the efficiency of steel commercial packaged boilers.[7] 74 FR 12020. DOE is making this change because this particular test method is no longer an approved method of rating the efficiency of steel commercial packaged boilers under DOE's regulations. Eliminating the references to ASME PTC 4.1 in the CFR does not introduce any changes to the test procedure for this equipment; it simply removes obsolete references. Manufacturers are required to test all steel boilers using the method that references the HI BTS–2000 test procedure, as they have been since October 23, 2006.

Currently, the uniform test method for the measurement of energy efficiency of commercial packaged boilers requires that only the combustion efficiency be tested and calculated in accordance with the HI BTS–2000. 10 CFR 431.86(c)(1)(ii). In this final rule, DOE is adopting as Federal energy conservation standards several thermal efficiency levels described in ASHRAE Standard 90.1–2007 that were proposed in the NOPR. For this reason, DOE is amending the definitions in 10 CFR 431.82 to incorporate the definition of ''thermal efficiency'' as written in section 3.0 of the HI BTS–2000 (Rev 06.07) test procedure and proposed in the NOPR. 74 FR 12021. Thus, DOE is adding the definition of ''thermal efficiency'' to 10 CFR 431.82 to read as follows: ''Thermal efficiency for a commercial packaged boiler is determined using test procedures prescribed under § 431.86 and is the ratio of the heat absorbed by the water or the water and steam to the higher heating value in the fuel burned.''

In addition to adding the definition of ''thermal efficiency'' to its regulations, DOE is amending the definition of ''combustion efficiency,'' as proposed and described in the NOPR, to remove the language defining the term as ''the efficiency descriptor for packaged boilers.'' 74 FR 12021. Thus, DOE is amending the definition of ''combustion efficiency'' in 10 CFR 431.82 to read as follows: ''Combustion efficiency for a commercial packaged boiler is determined using the test procedures prescribed under § 431.86 and equals 100 percent minus percent flue loss (percent flue loss is based on input fuel energy).''

DOE is amending 10 CFR 431.86 (Uniform test method for measurement of energy efficiency of commercial packaged boilers) to include requirements for the measurement and rating of thermal efficiency for those commercial packaged boiler equipment classes where the thermal efficiency metric is being used in today's final rule, after the effective date of this rulemaking (*i.e.*, March 2, 2012). DOE is also amending 10 CFR 431.86 to specify that combustion efficiency should be measured and rated for the two commercial packaged boiler equipment classes where the combustion efficiency metric is being used in today's final rule (*i.e.*, large gas hot water and large oil hot water commercial packaged boilers). These changes are described in detail in the NOPR and can be found in the regulatory text at the end of this notice. 74 FR 12021, 12048–49. DOE did not receive any comments in response to its test procedure proposals in the NOPR; thus, DOE is adopting them as proposed. These test procedure changes will become effective concurrently with the amended standard levels being adopted in today's final rule.

DOE proposed several test procedure updates responding to the changes made to HI BTS–2000 (Rev 06.07), 74 FR 12021–22, and is now amending the test procedure to adopt those changes, which are described in detail in the NOPR and are contained in the regulatory text at the end of this notice. *See id.* These changes do not introduce any changes to the methods in the test procedure. Manufacturers should use

[6] The Air-Conditioning and Refrigeration Institute (ARI) and the Gas Appliance Manufacturers Association (GAMA) announced on December 17, 2007, that their members voted to approve the merger of the two trade associations to represent the interests of cooling, heating, and commercial refrigeration equipment manufacturers. The merged association became AHRI on January 1, 2008.

[7] In the October 2004 test procedure final rule for commercial packaged boilers, DOE also incorporated by reference the American Society of Mechanical Engineers (ASME) Power Test Codes for Steam Generating Units, ASME PTC 4.1–1964, reaffirmed 1991 (including 1968 and 1969 addenda) (ASME PTC 4.1) as an alternate test method for rating the efficiency of steel commercial packaged boilers only. 69 FR 61956 (Oct. 21, 2004). DOE provided ASME PTC 4.1, with modifications, as an alternate test procedure for steel commercial packaged boilers because many manufacturers of steel boilers were unfamiliar with HI BTS–2000 and its predecessor, HI–1989, and typically tested their boilers using the ASME PTC 4.1 test procedure. Id. at 61951. DOE designated a transition period for manufacturers to convert from using the ASME PTC 4.1 test procedure to the HI BTS–2000 test procedure. Id. This would allow manufacturers of steel boilers an opportunity to become familiar with HI BTS–2000 and ensure that their equipment would be able to comply with EPCA standards using that procedure. Id. at 61956. DOE stated that it would allow the use of ASME PTC 4.1 as an alternate test procedure for two years after the publication of the October 2004 final rule. Id. The transition period ended on October 23, 2006, and now all commercial boilers are required to be tested using the HI BTS–2000 test procedure. 10 CFR 431.86.

the revised version of the test procedure (*i.e.,* HI BTS–2000 (Rev 06.07)) to represent their model's energy efficiency and compliance with the current Federal energy conservation standards effective September 21, 2009.

DOE is also adopting the proposed amendments for 10 CFR 431.86(c)(2)(iii), ''Test Measurements for a Boiler Capable of Supplying Either Steam or Water.'' As explained in the NOPR, DOE proposed to require manufacturers of large dual output commercial packaged boilers (*i.e.,* boilers capable of producing both steam and hot water) to test for both the combustion and thermal efficiencies of these boilers. DOE is requiring both the combustion and thermal efficiency test be conducted by manufacturers because the ASHRAE-amended efficiency levels for large dual output commercial packaged boilers would require this equipment to meet an efficiency level using both metrics (*i.e.,* combustion efficiency for a large boiler operated in hot water mode, and thermal efficiency for operation in steam mode). 74 FR 12022. Consistent with this approach, DOE is amending 10 CFR 431.86(c)(2)(iii) to require the testing and measurement of both thermal and combustion efficiency for any boiler capable of producing steam and hot water (*i.e.,* a dual output boiler) that is being tested only as a steam boiler for equipment manufactured on and after March 2, 2012. For equipment manufactured prior to that date, manufacturers will need to continue testing only for the combustion efficiency of dual output boilers. Manufacturers could also choose to perform both tests separately on large dual output boilers, including the combustion efficiency test in hot water mode and the thermal efficiency test in steam mode. Consequently, DOE is also amending the test procedure to permit manufacturers to test large dual output boilers separately for combustion efficiency in hot water mode and for thermal efficiency in steam mode, as proposed in the NOPR, if they choose to do so. 74 FR 12022.

In addition, DOE is adopting provisions in this final rule allowing commercial packaged boilers capable of supplying either steam or water (*i.e.,* dual output boilers) to test in steam mode only. In other words, DOE is allowing manufacturers to test dual output boilers only in steam mode, although large dual output boiler manufacturers must test for both thermal and combustion efficiency. This approach will ensure that a dual output boiler is meeting the thermal efficiency requirement when operated in steam mode and the combustion efficiency requirement when operated in hot water mode, because achieving compliance in steam mode is generally more challenging. Thus, a boiler that complies with the standard in steam mode would be presumed to meet the standard in hot water mode. DOE believes that giving manufacturers the option of testing dual output commercial packaged boilers only in steam mode would suffice for compliance purposes, and will avoid an unnecessary burden on manufacturers of dual output boilers.

The regulatory text following the preamble to today's notice contains the changes made to the definitions, reference materials, effective dates, and the uniform test procedure for commercial packaged boilers in 10 CFR 431.86.

B. Market Assessment

For the NOPR phase of DOE's review of the ASHRAE Standard 90.1–2007 efficiency levels, DOE developed a market assessment that provides an overall picture of the market for the equipment concerned, including the purpose of the equipment, the industry structure, and market characteristics. 74 FR 12022–24. The subjects addressed in the market assessment for this rulemaking included equipment definitions, equipment classes, manufacturers, quantities, and types of equipment sold and offered for sale. In response to the March 2009 NOPR, DOE did not receive any written or oral comments pertaining to the market assessment. Consequently, DOE did not revise the market analysis that was performed for the March 2009 NOPR. DOE summarized the key findings. 74 FR 12022–24. For additional detail, see chapter 2 of the final rule TSD.

C. Engineering Analysis

The engineering analysis establishes the relationship between the cost and efficiency of a piece of equipment DOE is evaluating for potential amended energy conservation standards. This relationship serves as the basis for cost-benefit calculations for individual consumers and the Nation. The engineering analysis identifies representative baseline equipment, which is the starting point for analyzing the possible energy-efficiency improvements. DOE typically structures its engineering analysis around one of three methodologies: (1) The design-option approach, which calculates the incremental costs of adding specific design options to a baseline model; (2) the efficiency-level approach, which calculates the relative costs of achieving increases in energy efficiency levels without regard to the particular design options used to achieve such increases; and/or (3) the reverse-engineering or cost-assessment approach, which involves a ''bottom-up'' manufacturing cost assessment based on a detailed bill of materials derived from tear-downs of the product being analyzed.

1. Approach and Assumptions

As explained in the March 2009 NOPR, DOE used an efficiency-level approach to evaluate the cost of commercial packaged boilers at the baseline efficiency level, and those above it. 74 FR 12024–27. DOE used the efficiency level approach because of the wide variety of designs available on the market and because the efficiency level approach does not examine a specific design to reach each of the efficiency levels. The efficiency levels that DOE considered in the engineering analysis were representative of commercial packaged boilers currently being produced by manufacturers at the time the engineering analysis was developed. DOE relied primarily on data collected through discussions with mechanical contractors or commercial boiler equipment distributors to develop its cost-efficiency relationship for commercial packaged boilers. DOE chose to collect contractor costs at three representative capacities for each ''small'' equipment class (400, 800, and 1500 kBtu/h) and then normalize the contractor costs by capacity to create a single cost-efficiency curve with 800 kBtu/h as the representative capacity for each equipment class, as described in the NOPR. 74 FR 12024. For each ''large'' equipment class analyzed, DOE used a similar approach, in which it collected cost data and created a cost-efficiency curve for one representative output capacity, 3,000 kBtu/h.

To extend the analysis to oil-fired commercial packaged boilers, DOE estimated that they are, on average, 3 percent more efficient than gas-fired boilers of identical construction because of the similar design characteristics. Also, since the construction of oil-fired and gas-fired boilers is basically the same, with the exception of some differences in controls, DOE assumed the incremental cost for increasing the efficiency of both types of boilers would be the same. The difference in the cost of controls would make no difference in the incremental cost of equipment because the same additional cost for controls would be applied across the range of oil-fired commercial boiler efficiencies. Once the cost-efficiency curves were normalized, the cost of the controls was subtracted. For these reasons, DOE estimated the incremental cost-efficiency curves for oil-fired equipment by shifting the cost-efficiency curves for each gas-fired equipment class by 3 percent.

In addition, DOE analyzed dual output boilers by classifying them as ''steam only'' boilers and assuming efficiency ratings for dual output boilers were representative of the efficiency of the boiler tested in ''steam mode.'' DOE assumed that the efficiency ratings for dual output boilers were representative of the efficiency of the boiler when tested in steam-only mode because the current procedure instructs manufacturers to test boilers capable of producing both steam and hot water either only in steam mode or in both steam mode and hot water mode. 10 CFR 431.86(c)(2)(iii)(A). Further, the test procedure states that if a manufacturer chooses to test a boiler in both steam mode and hot water mode, the boiler must be rated for efficiency in each mode as two separate listings in the I=B=R Directory. 10 CFR 431.86(c)(2)(iii)(B). 74 FR 12026–27. This approach had the effect of analyzing the most energy-intensive mode of dual output boilers.

DOE only received one comment in response to the engineering analysis presentation described in the March 2009 NOPR. ACEEE stated that it would like DOE to review its estimates of increased cost versus the historical record. (ACEEE, Public Meeting Transcript, No. 12 at p. 47) ACEEE stated that DOE is using a methodology asserted to be true without an effort to verify it, which is unfair to the entire community, including manufacturers.

DOE does not find merit to ACEEE's claims that the price change of meeting an amended standard declines after the standards' adoption. DOE recognizes that every change in minimum energy conservation standards is an opportunity for manufacturers to make investments beyond what would be required to meet the new standards in order to minimize the costs or to respond to other factors. DOE's manufacturing cost estimates seek to gauge the most likely industry response to the proposed energy conservation standards. DOE's analysis of responses must be based on currently available technology that will be nonproprietary when a rulemaking becomes effective, and thus cannot speculate on future product and market innovation.

DOE did not receive any other comments suggesting revisions to its approach to the engineering analysis or to the assumptions included in the engineering analysis in response to the March 2009 NOPR. Therefore, DOE did not revise its engineering analysis. Chapter 3 of the final rule TSD provides further detail on the methods used for the engineering analysis.

2. Results

The result of the engineering analysis is a set of cost-efficiency curves. Creating the cost-efficiency curves involved three steps: (1) Plotting the contractor cost versus efficiency; (2) aggregating the cost data by manufacturer; and (3) using an exponential regression analysis to fit a curve that best defines the aggregated data. DOE correlated the contractor cost as a function of each commercial packaged boiler's rated efficiency. DOE also normalized the data by adjusting the costs of every manufacturer's equipment so that the cost of its equipment was zero at the baseline ASHRAE Standard 90.1–2007 efficiency levels. This was done to show the average incremental cost of increasing efficiency above the ASHRAE Standard 90.1–2007 levels for each equipment class. DOE only presents the incremental costs of increasing the efficiency of a commercial packaged boiler in the final rule TSD to avoid the possibility of revealing sensitive information about individual manufacturers' equipment. While most manufacturers publish the rated thermal and/or combustion efficiencies of their commercial packaged boilers according to AHRI specifications, some do not and different manufacturers might have substantially different absolute costs for their equipment at the same efficiency level due to design modifications and manufacturing practices.

The cost-efficiency curves do not represent any single manufacturer, and they do not describe any variance among manufacturers. The curves simply represent, on average, the industry's cost to increase equipment efficiency. For this analysis, several types of boiler construction are aggregated into single equipment classes, and the cost-efficiency curves represent only an average boiler and not any individual boiler with any specific design characteristics. DOE attempted in its analysis to determine what the average cost-efficiency relationship would look like across the range of boiler types included in each equipment class. The results show that the cost-efficiency relationships for each of the ten equipment classes are nonlinear. As efficiency increases, manufacturing becomes more difficult and more costly for manufacturers to meet higher efficiency levels. Chapter 3 of the final rule TSD provides additional information about the engineering analysis, as well as the complete set of cost-efficiency results.

D. Markups To Determine Equipment Price

DOE understands that the price of commercial boilers depends on the distribution channel the customer uses to purchase the equipment. In the March 2009 NOPR, DOE explained how it developed the distribution channel markups for commercial packaged boilers. 74 FR 12027–28. DOE did not receive comments on the distribution channel markups or on their development in response to the March 2009 NOPR. Consequently, DOE used the same distribution channels and methodology to calculate markups for the final rule analysis as was used in the March 2009 NOPR.

Because DOE had developed costs for mechanical contractors directly in the engineering analysis, DOE estimated customer costs using a markup chain beginning with the mechanical contractor cost. DOE did not develop an estimate for manufacturer selling prices in the engineering analysis and consequently, did not develop an estimate of markups for national account distribution channels with sales directly from manufacturers to customers. DOE estimated most sales of commercial packaged boilers involved mechanical contractors because of installation complexity and the relatively few shipments made to mercantile/retail building types where national accounts are more common. Consequently, it was unnecessary to develop separate markups for costs through a national account distribution chain or directly from wholesalers.

DOE developed distributional channel markups in the form of multipliers that represent increases above the mechanical contractor cost. DOE applied these markups (or multipliers) to the mechanical contractor costs it developed from the engineering analysis. Sales taxes and installation costs were added to arrive at the final installed equipment prices for baseline and higher-efficiency equipment. DOE used two distribution channels for commercial boilers to describe how the equipment passes from the mechanical contractor to the customer (Table V.1). All sales for replacement applications are assumed to flow through channel 1. The analysis assumes that sales for New Construction flow through channel 2 depicted below.

TABLE V.1—DISTRIBUTION CHANNELS FOR COMMERCIAL PACKAGED BOILER EQUIPMENT

Channel 1 (replacements)	Channel 2 (new construction)
Mechanical Contractor.	Mechanical Contractor.
	General Contractor.
Customer	Customer.

DOE estimated shipment weights of approximately 33% for new construction and 67% for the replacement markets based on data developed for the shipments model and based on growth in new construction and replacement equipment in the existing stock. DOE received no comment on the new construction and replacement shipment fractions and did not modify these values for the final rule.

For each step in the distribution channels presented above, DOE estimated a baseline markup and an incremental markup. Both baseline and incremental markups depend only on the particular distribution channel and are independent of the boiler efficiency levels. DOE based the mechanical contractor markups on data from the Air Conditioning Contractors of America (ACCA)[8] and on the 2002 U.S. Census Bureau financial data[9] for the plumbing, heating, and air conditioning industry. DOE derived the general contractor markups from U.S. Census Bureau financial data for the commercial and institutional building construction sector.

The overall markup is the product of all the markups (baseline or incremental) for the different steps within a distribution channel plus sales tax. DOE calculated sales taxes based on 2008 State-by-State sales tax data reported by the Sales Tax Clearinghouse. Because both contractor costs and sales tax vary by State, DOE developed distributions of markups within each distribution channel by State. Chapter 5 of the final rule TSD provides additional detail on markups.

E. Energy Use Characterization

DOE used the building energy use characterization analysis to assess the energy savings potential of commercial boilers at different efficiency levels. In the March 2009 NOPR, DOE explained how it developed the energy use analysis for commercial packaged boilers. 74 FR 12028–29. This analysis estimates the energy use of commercial boilers at specified efficiency levels by using previously calculated Full Load Equivalent Operating Hour (FLEOH) metrics by building type and by climate across the United States. FLEOHs are effectively the number of hours that a system would have to run at full capacity to serve a total load equal to the annual load on the equipment. Boiler FLEOHs are calculated as the annual heating load divided by the equipment capacity. The FLEOH values used for the boiler analysis were based on simulations documented for the ''Screening Analysis for EPACT-Covered Commercial [Heating, Ventilating and Air-Conditioning] HVAC and Water-Heating Equipment''[10] (hereafter, 2000 Screening Analysis). (66 FR 3336 (Jan. 12, 2001)) and incorporated seven different building types and 11 different U.S. climates. DOE received no comments on the FLEOH assumptions forming the basis of the energy use characterization.

For each equipment class, DOE estimated the energy use of a given piece of equipment by multiplying the characteristic equipment output capacity by the FLEOH appropriate to each combination of representative building type and climate location. The product is effectively the total annual heat output from the boiler. The input energy is then determined by dividing the annual heat output by the thermal efficiency of the equipment at each efficiency level. The thermal efficiency is used here for all equipment classes since it defines the relationship between energy input and useful output of a commercial packaged boiler. For the two classes where a thermal efficiency metric was not specified by ASHRAE Standard 90.1–2007, an estimate of the thermal efficiency of equipment just meeting the combustion efficiency requirements specified by ASHRAE Standard 90.1–2007 was developed based on DOE's market analysis. DOE adjusted the unit energy use for each boiler to reflect the equipment thermal efficiency level DOE considered.

For condensing hot water boilers, DOE recognized that the thermal efficiency of a commercial packaged boiler in actual use depends on the return water conditions. In turn, the return water conditions are dependent upon the hydronic system design and control.[11] For DOE's analysis, the rated thermal efficiencies for fully condensing equipment were further adjusted to reflect return-water conditions based on installation in existing buildings with conventional hydronic heating coils. DOE's estimates allow for the supply water temperature to reset sufficiently to meet the estimated heating coil loads throughout the year.

DOE received several specific comments on the energy use analysis with regard to the development and use of seasonal efficiencies for condensing boilers. During the public meeting, ACEEE commented that it was concerned that the most typical application, particularly in the replacement market, for a commercial packaged boiler is providing hydronic heat, not supplemental heat in a variable air volume (VAV) system. ACEEE asserted that the supply temperature modulation is highly applicable as long as the user maintains the necessary return temperature. (ACEEE, Public Meeting Transcript, No. 12 at p. 58) ACEEE further commented that the discussion and treatment of supply temperature reset controls, which influence the seasonal efficiency parallels discussions used in the negotiated consensus agreement for residential boilers that DOE rejected. (ACEEE, Public Meeting Transcript, No. 12 at p. 61)

In response to the comments from ACEEE, DOE notes that the actual calculations for the development of the seasonal efficiency, as outlined in the TSD, assume a hydronic heating load that is a function of outdoor temperature, the calculations were also not reflective of a VAV-type reheat application. DOE's estimate of the average thermal efficiency impact for condensing boilers reflects the load-weighted thermal efficiency for a system serving hydronic air-heating coils in that type of space heating application. This is discussed in chapter 4 of the final rule TSD.

EarthJustice asked a clarifying question regarding the magnitude of the impact that reset temperature controls had on efficiency, suggesting it was roughly 3 percent for condensing boilers and less than 1 percent for non condensing boilers. (EarthJustice, Public Meeting Transcript, No. 12 at p. 60).

[8] Air Conditioning Contractors of America. Financial Analysis for the HVACR Contracting Industry, 2005. Available at: *http://www.acca.org.*

[9] The 2002 U.S. Census Bureau financial data for the plumbing, heating, and air conditioning industry is the latest version data set and was issued in December 2004. Available at: *http://www.census.gov/prod/ec02/ec0223i236220.pdf.*

[10] U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, ''Energy Conservation Program for Consumer Products: Screening Analysis for EPACT-Covered Commercial HVAC and Water-Heating Equipment Screening Analysis'' (April 2000).

[11] A hydronic system is the distribution system for hot or cold water in a closed loop throughout a building or other type of space for the purposes of heating or cooling. The description of such a system would include the piping, the heating and cooling coils, and radiators, as well as the controls used to operate the system.

In response to the comment from EarthJustice, DOE generally agrees that this is a correct interpretation. Literature on the impact of supply water temperature reset (*i.e.,* resetting the supply water temperature from the boiler in response to building heating load or a suitable other sensed condition like outdoor temperature serving as a proxy for load) on boiler efficiency generally shows that for return water temperatures from 140 °F to 180 °F (*i.e.,* above the temperatures required for condensing), the change in boiler efficiency is typically less than 1 percent, with the actual value dependent upon the fraction of full load input, whether the boiler is a condensing boiler or not. For condensing boilers, which can operate at lower return temperatures, reducing the return water temperature below 140 °F results in significant increases in the boiler's thermal efficiency, with the magnitude of the impact being a function of the fraction of full load input at these temperatures. Very low return water temperatures (*e.g.,* 60 °F) can result in thermal efficiencies of 99% in some condensing boiler equipment designs, but few hydronic systems have such low return water temperatures. In a primarily space-heating application (as opposed to a VAV reheat application), where hot water supply temperature reset is used, both the temperature of water delivered by the boiler and the thermal load met by the boiler both increase with colder outside temperatures. During the period when the majority of the load is met, the boiler is operating closer to its design delivery point (*i.e.,* at a higher temperature). DOE's calculation of seasonal efficiency reflected the boiler's operating conditions.

In responding to ACEEE's point on the joint proposal regarding prescriptive requirements for resetting the water supply temperature for residential boilers, DOE notes that there are many benefits to the application of supply water reset controls on commercial boilers as well. However, many of these benefits impact reduction in the total heating load served by the boiler (through reduction of losses in the distribution system, simultaneous heating and cooling in the building HVAC hydronic and supply air reheat systems) rather than a change in the boiler efficiency. Other benefits from supply water reset controls include reducing both cycling losses in non-modulating boilers and, to a lesser extent, shell and standby losses, which would accrue to both condensing and non-condensing boilers similarly, but are most significant at low load conditions.

Burnham asked whether the simulations used in the analysis included supply temperature reset in condensing boilers and did not include supply temperature reset for non-condensing boilers. (Burnham, Public Meeting Transcript, No. 12 at p. 63) Burnham also wanted to know if these simulations included distribution losses. *Id.* DOE clarified at the public meeting that the original FLEOH simulation analysis did not directly account for the impact of supply temperature reset on boiler efficiency. DOE further clarifies here that hydronic system distribution losses were not part of the original building simulations used to develop the FLEOH metrics, but that the FLEOH development did include estimates of heat used internally in the boiler to offset standby loss impacts. As with residential boilers, DOE recognizes that there are significant benefits to hot water supply temperature reset in buildings. However, DOE does not have authority to mandate supply temperature reset controls as part of a federal efficiency standard.

Commenting on the discussion on the impact of water temperature reset, AHRI stated that they were in the process of developing rules for commercial boiler manufacturers to provide additional information on how boiler models will operate at different inlet water temperatures. AHRI indicated that the professional designers of commercial hydronic systems want that type of information because there may be a broad range of ''design conditions'' depending on commercial application. AHRI commented that they have an internal group working on this issue within the certification program to help ensure certification to the federal requirements and uniformity between other information [regarding performance at varying conditions] manufacturers provide to their customers. (AHRI, Public Meeting Transcript, No. 12 at pp. 61–63)

DOE estimated the national energy impacts of higher efficiency equipment by: (1) Mapping climate locations onto regions; and (2) estimating the fraction of each year's national equipment shipments (by product category) within market segments, as defined by a representative building type within a particular region of the United States. Seven representative building types were used, including: Assembly, Education, Food Service, Lodging, Office, Retail, and Warehouse buildings. The estimated allocation of national boiler shipments to market segments was based on information from the 2003 Commercial Buildings Energy Consumption Survey (CBECS) [12] and the relative fraction of respondents reporting the use of boilers in commercial building floor space within each market segment.

DOE developed the annual energy consumption estimates for commercial boilers for each of seven key commercial building types in 11 geographic regions and at each efficiency level. Chapter 4 of the final rule TSD provides additional details on the energy use characterization analysis.

F. Life-Cycle Cost and Payback Period Analyses

DOE conducted the LCC and PBP analyses to estimate the economic impacts of potential standards on individual customers of commercial packaged boilers. In the March 2009 NOPR, DOE explained the development of these analyses for commercial packaged boilers. 74 FR 12029–32 DOE used the same spreadsheet models to evaluate the LCC and PBP for the final rule as it used for the NOPR; however, DOE updated certain specific inputs to the models. Details of the spreadsheet model and of all the inputs to the LCC and PBP analyses are in chapter 5 of the final rule TSD. DOE conducted the LCC and PBP analyses using a spreadsheet model developed in Microsoft Excel for Windows 2003.

The LCC is the sum of the total installed cost (taking into account contractor cost, sales taxes, distribution chain markups, and installation cost) and operating expenses (energy, repair, and maintenance costs) over the equipment lifetime, with all costs discounted back to the purchase date. Because DOE is considering both the efficiency levels in ASHRAE Standard 90.1–2007 and more-stringent efficiency levels, the date on which an amended energy conservation standard would become effective depends on the efficiency level ultimately adopted. To fairly compare the LCC and PBP for both the ASHRAE Standard 90.1–2007 levels and higher efficiency levels, DOE presumed that the purchase year for the LCC calculation is 2014, the earliest year in which DOE can establish an amended energy conservation level at an efficiency level more stringent than the ASHRAE Standard 90.1–2007 efficiency level. For each efficiency level analyzed, the LCC analysis required input data for the total installed cost of the equipment, the operating costs, including energy, repair

[12] Energy Information Administration (2003). Available at: *http://www.eia.doe.gov/emeu/cbecs/contents.html.*

and maintenance costs, and the discount rate. To compute each LCC, DOE discounted all future operating costs to the time of purchase and summed them over the lifetime of the equipment.

The PBP estimates the amount of time it would take the customer to recover the incremental increase in the purchase price of more-efficient equipment through lower operating costs. The PBP is the change in purchase price divided by the change in annual operating cost that results from the standard. DOE expresses this period in years. However, unlike the LCC, which uses a stream of operating expenses, including energy expenses, the PBP is defined using a single year's annual expenses. By convention, DOE uses the first year's operating expenses in the PBP calculation.

Recognizing that each business that uses commercial packaged boiler equipment is unique, DOE analyzed variability and uncertainty by performing the LCC and PBP calculations assuming a one-to-one correspondence between business types and market segments (characterized as building types) for customers located in seven types of commercial buildings. DOE developed discount rates appropriate for the customers in each building type and used the estimated annual energy use for each commercial packaged boiler unit described in section V.E. Because energy use of commercial packaged boilers is sensitive to climate and building usage, DOE's analysis included variation by State and building type. Aside from energy use, other important factors influencing the LCC and PBP analyses are energy prices, installation costs, equipment distribution markups, and sales tax. DOE used weighting factors representing fractional boiler sales by state and building type to generate national average LCC savings and PBP for each efficiency level.

DOE conducted the LCC and PBP analyses using a commercially-available spreadsheet model. This spreadsheet accounts for variability in energy use, installation costs, maintenance costs and energy costs, and uses weighting factors for shipments to different building types and to States to generate national LCC savings and PBP statistics by efficiency level. The results of DOE's LCC and PBP analyses are summarized in section VI and described in detail in chapter 5 of the final rule TSD.

Table V.2 summarizes the inputs and key assumptions DOE used in the LCC and PBP analysis and shows how DOE modified these inputs and key assumptions for the final rule. The changes in the input data and the discussion of the overall approach to the LCC analysis are provided in more detail in chapter 5 of the final rule TSD.

TABLE V.2—SUMMARY OF INPUTS AND KEY ASSUMPTIONS USED IN THE LCC AND PBP ANALYSES

Inputs	NOPR description	Changes for final rule
Affecting Installed Costs		
Equipment Price	Equipment price was derived by multiplying contractor cost (from the engineering analysis) by mechanical and general contractor markups as needed plus sales tax from the markups analysis.	None.
Installation Cost	Installation cost includes installation labor, installer overhead, and any miscellaneous materials and parts, derived from *RS Means CostWorks 2007*.[13] DOE added additional costs to reflect the installation of near condensing and condensing boilers at efficiency levels more stringent than ASHRAE Standard 90.1–2007 efficiency levels. These costs include control modifications, stainless steel flues, and condensate pumps and piping to remove condensate.	Modified installation costs to reduce incremental control costs charged at condensing equipment levels. Also removed costs for condensate pump below condensing levels, but retained condensate drain costs for near condensing levels (where corrosion resistant flues are required).
Affecting Operating Costs		
Annual Energy Use	DOE derived annual energy use using FLEOH data for commercial boilers combined with thermal efficiency estimates for each boiler efficiency level analyzed. DOE did not incorporate differences in annual electricity use by efficiency level. DOE used State-by-State weighting factors to estimate the national energy consumption by efficiency level.	None.
Fuel Prices	DOE developed average commercial natural gas and fuel oil prices for each State using EIA's State Energy Database Data for 2006 for natural gas and oil price data.[14] DOE used AEO2008 energy price forecasts to project oil and natural gas prices into the future.	Updated State Energy Database Data for natural gas and fuel oil prices to 2007 data (most recent available). Used AEO2009 energy price forecasts (April 2009 Reference Case incorporating AARA).
Maintenance Cost	DOE estimated annual maintenance costs for commercial boilers based on MARS 8 Facility Cost Forecast System Database[15] for commercial boilers. Annual maintenance cost did not vary as a function of efficiency.	None.

TABLE V.2—SUMMARY OF INPUTS AND KEY ASSUMPTIONS USED IN THE LCC AND PBP ANALYSES—Continued

Inputs	NOPR description	Changes for final rule
Repair Cost	DOE estimated the annualized repair cost for baseline efficiency commercial boilers based on cost data from MARS 8 Facility Cost Forecast System Database for commercial boilers. DOE assumed that repair costs would vary in direct proportion with the MSP at higher efficiency levels because it generally costs more to replace components that are more efficient.	None.
Affecting Present Value of Annual Operating Cost Savings		
Equipment Lifetime	DOE estimated equipment lifetime assuming a 30-year lifespan for all commercial boilers based on data published by ASHRAE.	None.
Discount Rate	Mean real discount rates for all buildings range from 2.3 percent for education buildings to 5.9 percent for retail building owners.	None.
Analysis Start Year	Start year for LCC is 2014, which is four years after the publication of the final rule for amended energy conservation standards higher than ASHRAE.	None.
Analyzed Efficiency Levels		
Analyzed Efficiency Levels	DOE analyzed the baseline efficiency levels (ASHRAE Standard 90.1–2007) and up to four higher efficiency levels for all ten equipment classes. See the engineering analysis for additional details.	None.

In response to the methodology presented in the March 2009 NOPR, DOE received comments on the installation cost assumptions used in the LCC analysis. Regarding the installation costs assumptions, ACEEE asked whether DOE assumed that commercial customers did not replace the control package for the lowest efficiency boilers with one specific to that boiler. ACEEE further stated since one-third of the commercial packaged boiler shipments went to new construction, it would seem that these boilers would have to be installed with a controls package. In addition, ACEEE asked whether the costs of controls should exist for a replacement market given the fraction of boilers that would be shipped there even without controls. ACEEE questioned an assumption that there are no control costs for the lowest-efficiency boilers. (ACEEE, Public Meeting Transcript, No. 12 at p. 72)

DOE responded to ACEEE at the public meeting that it did not necessarily assume explicitly that there were no controls shipped with the boiler, but that the analysis did include a differential control cost for the higher-efficiency boilers.

AHRI commented that they were not aware of any data to indicate what the differences in control costs might be for higher efficiency boilers, but commented that there probably is going to be some type of control to monitor and signal the boiler that it is getting rid of the condensate and that this would be a control you wouldn't have otherwise. (AHRI, Public Meeting Transcript, No. 12 at pp. 73–74) AHRI also asked if DOE included any factor to account for possible requirements to treat the boiler condensate.

For the final rule analysis, DOE reviewed and modified the assumptions for control costs resulting in a reduction in the control cost differential for the condensing boiler to $250. In addition, DOE reviewed the assumptions for costs of condensate pumps generally. For the March 2009 NOPR, condensate pumps were incorporated for both condensing and near condensing boiler efficiency levels. Review of data on options for boiler installations indicated that condensate pumps would be common for many fully condensing boilers where condensate is generated in the boiler itself, but other means could be incorporated to help alleviate condensation directly in the flue that occurs with near condensing efficiency levels. DOE included the cost for condensate drainage for all near condensing and condensing efficiency levels (levels for which a corrosion resistant flue was also incorporated).

With regard to the possible costs for condensate treatment, DOE is aware that some jurisdictions may have requirements for condensate treatment and that there are commercial products designed to provide this treatment, but did not have sufficient information on the extent that such requirements exist across the U.S. to estimate typical installation costs and ongoing maintenance costs for such treatment. Consequently, DOE did not adjust the maintenance (or repair) costs from those used in the March 2009 NOPR. DOE acknowledges that to the extent that condensate treatment is required, these would be an additional installation and maintenance cost for the condensing efficiency levels.

Other modifications made to the LCC analysis were to update the fuel prices and fuel price forecast data. Fuel prices are needed to convert the gas or oil energy savings from higher-efficiency equipment into energy cost savings. Because of the variation in annual fuel consumption savings and equipment costs across the country, it is important to consider regional differences in electricity prices. DOE updated the average commercial natural gas and

[13] RS Means CostWorks 2007, R.S. Means Company, Inc. 2007. Kingston, Massachusetts (2007). Available at: *http://www.meanscostworks.com/*.

[14] Natural Gas Price and Expenditure Estimates by Sector, EIA, 2007. Available at: *http://www.eia.doe.gov/emeu/states/sep_fuel/html/fuel_pr_ng.html.* 2007 Distillate Fuel Price and Expenditure Estimates by Sector, EIA, 2007. Available at: *http://www.eia.doe.gov/emeu/states/hf.jsp?incfile=sep_fuel/html/fuel_pr_df.html.*

[15] MARS 8 Facility Cost Forecast System Database, Whitestone Research, 2008. Washington, DC. Available at: *http://www.whitestoneresearch.com/mars/index.htm.*

commercial fuel oil prices at the State level using the latest available Energy Information Administration (EIA) data (2007). These data were converted to 2008$ using a Gross Domestic Product (GDP) price inflator. The effective 2007 prices (in 2008$) range from approximately $7.71 per million Btu to approximately $27.96 per million Btu for natural gas, and from approximately $15.21 per million Btu to approximately $18.04 per million Btu for commercial fuel oil. To account for variation in fuel costs occurring in different kinds of businesses, DOE followed the same procedure used in the NOPR to adjust the state average fuel price to business-type specific fuel prices, which was to use the ratio of the average fuel costs for that business type to the commercial sectors as a whole, as provided in EIA's 2003 CBECS [16] data set.

DOE also updated the fuel price forecast data to use the most recent EIA/AEO forecasts. EIA updated the AEO forecasts in April 2009 to reflect the provisions of the American Recovery and Reinvestment Act (ARRA) enacted in mid-February 2009. The reference case in the recently published AEO2009, which reflected laws and regulations in effect as of November 2008, does not include ARRA. The need to develop an updated reference case following the passage of ARRA also provided the EIA with an opportunity to update the macroeconomic outlook for the United States and global economies, which have been changing at an unusually rapid rate in recent months.

A very significant spike in oil prices in 2008, in conjunction with a change in assumptions in the April AEO2009 reference case meant it was not possible to use both the 2007 state oil cost data and the future oil fuel price index to directly generate future national commercial average fuel-oil prices that reasonably match those in the AEO2009 forecast. To provide a more closely matched estimate, DOE applied an adjustment factor to the fuel prices to both starting point gas and oil prices such that the national average commercial prices from 2012–2030 would match the AEO forecasts in constant years dollars, but retain the state-by-state variation reflected in state pricing data. As was done for the NOPR, DOE extrapolated the trend in fuel prices between 2020 and 2030 of the forecast to establish prices for the years from 2031 to 2042 for the LCC analysis.

See chapter 5 of the final rule TSD for further details on the LCC and PBP analysis and assumptions.

G. Shipments Analysis

The shipments analysis develops future shipments for each class of commercial packaged boiler based on current shipments and equipment life assumptions, and takes into account the existing stock and expected growth of buildings using commercial packaged boilers. DOE assumed the relative distribution of shipments by size and boiler equipment class would resemble that of current shipments. In the March 2009 NOPR, DOE explained the development of the shipment analysis for commercial packaged boilers 74 FR 12033.

DOE received several comments on the assumptions used in the shipments analysis for the NOPR. On the distribution of equipment lifetimes, AHRI commented that in some regions of the country, emissions regulations may promote early replacements of boilers, but did not provide data on the frequency that this may occur or the impact that this may have on the distribution for boiler lifetimes. (AHRI, Public Meeting Transcript, No. 12 at p. 86) ACEEE commented that there is a trend toward replacements of larger boilers with trains of smaller boilers, but admitted to not having quantitative numbers to describe the trend. (ACEEE, Public Meeting Transcript, No. 12 at p. 80) ACEEE also commented that boilers are rated on input capacity, but since the relationship between input and output capacity changes with efficiencies, for a fixed output, the input capacities required for the market will have a downward trend based on a change in efficiency considered alone. In addition, ACEEE asserted that reductions in the degree of historical [unnecessary] oversizing might be reduced in the future, which would further result in a reduction in typical boiler size. (ACEEE, Public Meeting Transcript, No. 12 at p. 81)

In responding to ACEEE at the public meeting, AHRI agreed that in fact there are replacement situations where the use of trains of modular or stage boilers makes sense today. AHRI also pointed out that a target of ASHRAE 90.1 has been to achieve better sizing and better system design as part of the overall goal to reduce energy consumption in commercial buildings. AHRI did not have an idea of how much effect these replacement situations would really have on shipments. (AHRI, Public Meeting Transcript, No. 12 at p. 83)

In response to ACEEE regarding the natural reduction in input capacity as a function of higher efficiency equipment, DOE notes that the shipments model starting point, as well as the output of the model, is the number of boilers shipped, not the total input capacity of all shipments. Furthermore, the cost calculations developed in the engineering analysis and subsequently used in the analysis are based on the output capacity of the boiler. The sum total of output capacity and shipments is not affected by the change in efficiency brought about by standards. With regard to the other comments, given the lack of sufficient quantitative data on the impact that these trends may have on shipments by equipment size or class that would be needed to calibrate a revised model, DOE did not revise the shipments model methodology from that of the March 2009 NOPR.

DOE did update the model to reflect new estimates of future building new construction and resulting building stock in each year based on the April 2009 AEO2009 reference case. DOE reports the revised shipment forecasts for the boiler market for selected years from 2012 to 2042 for the base case in Table V.3 below.

[16] EIA's Commercial Buildings Energy Consumption Survey, Energy Information Agency. Public use microdata available at: *http://www.eia.doe.gov/emeu/cbecs/cbecs2003/public_use_2003/cbecs_pudata2003.html.*

Table V.3. Base-Case Shipments Forecast for Commercial Boilers

Equipment	Thousands of Units Shipped by Year and Equipment Class								
	2012	2015	2020	2025	2030	2035	2040	2042	Cumulative Shipments (2012-2042)
Small gas-fired hot water	7110	7377	7832	8364	9420	11019	13023	13812	292,525
Small gas-fired steam all except natural draft	2409	2500	2654	2834	3192	3734	4413	4680	99,120
Small gas-fired steam natural draft	3702	3841	4078	4355	4905	5737	6780	7191	152,306
Small oil-fired hot water	1998	2073	2201	2350	2647	3096	3659	3881	82,197
Small oil-fired steam	3349	3475	3690	3940	4438	5191	6135	6506	137,801
Large gas-fired hot water	1146	1189	1262	1348	1518	1776	2099	2226	47,142
Large gas-fired steam all except natural draft	2086	2164	2298	2454	2764	3233	3821	4052	85,823
Large gas-fired steam natural draft	2674	2774	2945	3145	3542	4144	4897	5194	109,999
Large oil-fired hot water	558	579	615	657	740	865	1022	1084	22,967
Large oil-fired steam	4407	4572	4855	5184	5839	6830	8072	8561	181,317
Total	29440	30544	32429	34629	39004	45625	53920	57188	1,211,199

H. National Impact Analysis—National Energy Savings and Net Present Value Analysis

The national impacts analysis evaluates the impact of a proposed energy conservation standard from a national perspective rather than from the customer perspective represented by the LCC. This analysis assesses the national energy savings (NES) and national net present value (NPV) of the commercial customer costs and savings that are expected to result from amended standards at the analyzed efficiency levels. For the final rule analysis, DOE used the same spreadsheet model used in the March 2009 NOPR to calculate the energy savings and the national economic costs and savings from new standards, but with updates to specific input data.

For each efficiency level analyzed, DOE calculated the NPV and NES for adopting more-stringent standards than the efficiency levels specified in ASHRAE Standard 90.1–2007. The NES refers to cumulative energy savings from 2012 through 2042. DOE calculated new energy savings in each year relative to a base case, defined to include DOE adoption of the efficiency levels specified by ASHRAE Standard 90.1–2007. The NPV refers to cumulative monetary savings. DOE calculated net monetary savings for higher standards in each year relative to the base case as the total operating cost savings minus the increases in total installed cost. Cumulative savings are the sum of the annual NPV over the specified period. DOE accounted for operating cost savings until 2085, when 95 percent of all the equipment installed in 2042 should be retired.

Table V.4 summarizes the inputs to the NES spreadsheet model along with a brief description of the data sources. The results of DOE's NES and NPV analysis are summarized in section VI.B.2 and described in detail in chapter 7 of the final rule TSD.

TABLE V.4—SUMMARY OF NES AND NPV MODEL INPUTS

Inputs	Description	Changes for final rule
Shipments	Annual shipments from shipments model (see chapter 6 of the final rule TSD).	Used updated shipment estimates based on AEO2009 reference case building stock forecasts.

TABLE V.4—SUMMARY OF NES AND NPV MODEL INPUTS—Continued

Inputs	Description	Changes for final rule
Effective Date of Standard	2014 for adoption of a more-stringent efficiency level than those specified by ASHRAE Standard 90.1–2007. 2012 for adoption of the efficiency levels specified by ASHRAE Standard 90.1–2007.	No change.
Base Case Efficiencies	Distribution of base-case shipments by efficiency level	No change.
Standard Case Efficiencies	Distribution of shipments by efficiency level for each standards case. Standards-case annual shipment-weighted market shares remain the same as in the base case and each standard level for all efficiencies above the efficiency level being analyzed. All other shipments are at the efficiency level.	No change.
Annual Energy Use per Unit	Annual national weighted-average values are a function of efficiency level. (See chapter 4 of the final rule TSD.).	No change.
Total Installed Cost per Unit	Annual weighted-average values are a function of efficiency level. (See chapter 5 of the final rule TSD.).	Modified to reflect changes in installation costs from LCC analysis.
Repair Cost per Unit	Annual weighted-average values increase with manufacturer's cost level. (See chapter 5 of the final rule TSD.).	No change.
Maintenance Cost per Unit	See chapter 5 of the final rule TSD	No change.
Escalation of Fuel Prices	*AEO2008* forecasts (to 2030) and extrapolation for beyond 2030. (See chapter 5 of the final rule TSD.).	*Modified to reflect April 2009 AEO2009 reference case forecasts.*
Site-Source Conversion	Based on average annual site-to-source conversion factor for natural gas from *AEO2008*.	Based on average annual site-to-source conversion factor for natural gas from *AEO2009* reference case.
Discount Rate	3 percent and 7 percent real	No change.
Present Year	Future costs are discounted to 2008	No change.

DOE received no comments on the general methodology and the results for the NES and NPV analysis. As a result, DOE retained the same methodology as was used in the NOPR for the final rule. Changes to these results from the NOPR are due to changes in the development of national average inputs to the NES and NPV analysis as a result of the revisions to the LCC and shipments calculations.

I. Environmental Assessment

DOE prepared an environmental assessment (EA) which assesses the impacts of the proposed rule pursuant to the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*) (NEPA), the regulations of the Council on Environmental Quality (40 CFR parts 1500–1508), and DOE's regulations for compliance with the National Environmental Policy Act (10 CFR part 1021). This EA includes a concise examination of the impacts of emission reductions likely to result from the proposed standards for commercial packaged boilers and water-cooled and evaporatively cooled commercial packaged air conditioners and heat pumps with a cooling capacity at or above 240,000 Btu/h and less than 760,000 Btu/h. The EA has been incorporated as chapter 8 in the final rule TSD.

Specifically, DOE estimated the reduction in total emissions of carbon dioxide (CO_2), nitrogen oxides (NO_X) and sulfur dioxide (SO_2). A fourth pollutant, mercury (Hg), is emitted in only trace amounts by the equipment covered in this analysis that further analysis of Hg in this EA would be uninformative; as such, DOE does not discuss Hg emissions in this EA.

1. Sulfur Dioxide

Sulfur dioxide is a chemical compound that is produced by various natural and industrial processes and is a key contributor to acid rain. The Clean Air Act Amendments of 1990 set an SO_2 emissions cap on all power generation, but permitted flexibility among generators through the use of emissions allowances and tradable permits. This SO_2 trading process (sometimes called ''cap and trade'') does not, however, cover commercial packaged boilers. The EPA's New Source Performance Standards (NSPS) limit, among other things, SO_2 emissions from boilers built after a certain date. In particular, 40 CFR part 60 subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, requires that small industrial-commercial-institutional steam generating units constructed, modified, or reconstructed after June 9, 1989, must limit the allowable sulfur content in fuel oil to 0.5 weight percent for any steam-generating unit that has a maximum design heat input capacity of 100 million British thermal units (Btu) per hour. (40 CFR 60.40c–60.48c) Commercial packaged boilers that have a maximum design heat input capacity of 100 million Btu per hour would be an extremely small subset of all boilers being considered in this rule. Consequently, there is a direct SO_2 environmental benefit from a reduction in fuel consumption resulting from the higher efficiency standards for commercial packaged boilers being adopted in today's final rule.

2. Nitrogen Oxides

Nitrogen oxides, or NO_X, are the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. Nitrogen oxides form when fossil fuel is burned at high temperatures, as in a combustion process, and are considered a criteria pollutant under the Clean Air Act. The primary man-made sources of NO_X emissions are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fossil fuels. NO_X emissions from 28 eastern States and the District of Columbia (DC) are limited under the Clean Air Interstate Rule, published in the **Federal Register** on May 12, 2005. Although the rule has been remanded to the EPA by the D.C. Circuit Court, it will remain in effect until it is replaced by a rule consistent with the Court's opinion in *North Carolina* v. *EPA*.[17] Under CAIR, States must achieve

[17] On July 11, 2008, the U.S. Court of Appeals for the District of Columbia Circuit (D.C. Circuit) issued its decision in *North Carolina* v. *Environmental Protection Agency,* in which the Court vacated the CAIR rule. 531 F.3d 896 (D.C. Cir. 2008). However, in a December 23, 2008 opinion, the same panel of the D.C. Circuit reinstated the CAIR rule pending

the required emission reductions using one of two compliance options: (1) Meet an emissions budget for each regulated State by requiring power plants to participate in an EPA-administered interstate cap-and-trade system that caps emissions in two stages; or (2) meet an individual State emissions budget through measures of the State's choosing. In general, however, CAIR basically covers two general classes of NO_X emitters: (1) Stationary, fossil-fuel-fired boilers or stationary, fossil-fuel-fired combustion turbines serving generators with nameplate capacity of more than 25 MW of electricity and producing that electricity for sale; and (2) any unit that has a maximum design heat input rate of greater than 250 million Btu/h (40 CFR 96.4). Commercial packaged boilers have a maximum design heat input rate of less than 250 million Btu/h and are not used for commercial power production. Hence, requirements of the CAIR do not apply to commercial packaged boilers. Consequently, there is a direct NO_X environmental benefit from a reduction in fuel consumption resulting from the higher efficiency standards for commercial packaged boilers.

The EA assesses environmental impacts from alternate standard levels analyzed for commercial packaged boilers based on the results of the national energy savings analysis (see chapter 7). Standards for 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 were also considered in this rule. However, since no products could be identified on the market in this class, no subsequent energy or environmental impacts were considered in this EA. For commercial packaged boilers, DOE calculated emission reductions using emission factors appropriate to commercial boilers that use natural gas or fuel oil as fuel sources. The emissions factors provide typical ratios of emissions for SO_2, NO_X, and CO_2 per unit of natural gas or fuel oil energy consumed. DOE multiplied each emission factor, respectively, by the annual energy savings for each class of commercial packaged boiler as developed in the NES for the final rule. The annual emission reductions were then summed over the period from 2012–2042 separately for each class.

EPA's compliance with its July 11, 2008 ruling. 550 F.3d 1176 (D.C. Cir. 2008) (*remand of vacatur*). As such, CAIR's trading programs and target deadlines remain in place at present; however, the long term prospects for and shape of those trading programs are unknown.

The resulting emission reductions are shown in section VI.

J. Monetizing Carbon Dioxide and Other Emissions Impacts

DOE also calculated the possible monetary benefit of CO_2, NO_X, and SO_2 emissions reductions. Cumulative monetary benefits were determined using discount rates of 3 and 7 percent. DOE monetized reductions in CO_2 emissions stemming from the standards adopted in this final rule using a range of monetary values drawn from studies that attempt to estimate the present value of the marginal economic benefits (based on the avoided marginal social costs of carbon) likely to result from reducing greenhouse gas emissions. The marginal social cost of carbon is an estimate of the monetary value to society of the environmental damages of CO_2 emissions.

DOE monetized reductions in SO_2 emissions using a ranges estimates of monetized benefits that could be attributed to the reduction of SO_2 emissions from commercial packaged boilers. At one end, DOE used the annual estimates of an SO_2 trading price as developed in the National Energy Modeling System (NEMS) electricity market model for the western and eastern U.S. This model estimates a trading price for SO_2 in the utility markets, and, while not directly applicable to commercial packaged boilers, it reflects a market value for the cost of reducing SO_2 emissions into the atmosphere. As DOE is interested in a national estimate, it used a simple average of the trading prices from the eastern and western electricity market models for the period from 2012–2030, and extrapolated the prices out through 2042. The range in SO_2 costs from this source varied both by year and region from $86 to $1,012 (2007$). At the higher end, DOE used an estimate of environmental damage costs of $7,300 per ton of SO_2 from stationary sources, measured in 2001$ or $8,542 per ton in 2007$. These low and high values were in turn multiplied by the reduction in emissions of SO_2 estimated for the period from 2012–2042.

DOE estimated the national monetized benefits of NO_X reductions associated with this rulemaking based on environmental damage estimates from the literature. Available estimates suggest a very wide range of monetary values for NO_X emissions, ranging from $370 per ton to $3,800 per ton of NO_X from stationary sources, measured in 2001$, or a range of $432 per ton to $4,441 per ton in 2007$.

The resulting estimates of the present value of monetary benefits associated with the national reduction of CO_2, NO_X, and SO_2 emissions resulting from adoption of standards for commercial packaged boilers at the ASHRAE 90.1–2007 efficiency levels are shown in section VI. In addition, estimates of the additional benefits for adopting standards higher than the ASHRAE 90.1–2007 efficiency levels are also provided in section VI.

DOE notes that neither EPCA nor NEPA requires that the economic value of emissions reduction be incorporated in the LCC or NPV analysis of energy savings. DOE has chosen to report these benefits separately from the net benefits of energy savings, but considered these benefits when weighing the benefits and burdens of standards.

K. Other Issues

1. Impact of Standards on Natural Gas Prices

In the March 2009 NOPR public meeting, EarthJustice pointed out that DOE had, in certain residential rulemakings, begun to calculate the potential impact of energy efficiency standards on natural gas prices and encouraged DOE to do something similar in the ASHRAE products rulemaking analysis. (EarthJustice, Public Meeting Transcript, No. 13 at p. 61)

In response to these comments, DOE undertook a further review of the potential impact of commercial packaged boiler energy efficiency standards on natural gas prices. A review of the economic literature indicates that there is support for the idea that an impact will occur and that that impact would result in a reduction in overall natural gas prices. DOE examined two preliminary analyses of the effect that a reduction in natural gas usage due to efficiency standards would have on natural gas prices. These were analyses and results published in the 2007 furnace and boiler final rule (72 FR 65136, 65152–54 (Nov. 19, 2007)) and in the preliminary analysis documented in the preliminary TSD for standards for residential water heaters. The natural gas price analysis for the furnaces and boilers rulemaking was conducted using a version of the 2007 NEMS–BT that was modified to account for energy savings associated with possible standards for residential gas furnaces, and the price analysis for the residential water heaters standards rulemaking was conducted using the 2008 NEMS–BT.

The preliminary analyses in both cases estimated that gas demand reductions resulting from more stringent minimum energy conservation standards would reduce the U.S.

average wellhead natural gas price. An inverse elasticity was calculated in both studies, relating a percentage change in the average wellhead natural gas price to a percentage reduction in total annual natural gas consumption. In the furnace and boiler rule, DOE estimated that this inverse elasticity was approximately 0.9 percent. In the residential water heater preliminary analysis, DOE estimated an inverse elasticity of approximately 0.8 percent. Given the closeness of these two figures, and the corresponding similarity in energy end-use profile expected for space heating equipment, DOE chose to estimate the impact for commercial packaged boilers based on the elasticity estimated for residential furnaces. DOE's analysis was based on the impact calculated from adopting the highest efficiency level analyzed for the class of small gas fired hot water boilers.

The condensing efficiency level for small gas fired hot water boilers showed an estimated savings of 0.223 quads over the period from 2012–2042. DOE estimated the impact that the stream of energy savings would have on natural gas prices over the same period. Using this time period, DOE estimated that the average price changes amounted to a decrease in the wellhead price for natural gas of 0.25 cents per million Btu. Analysis done for the furnace and boiler rule showed that while changes in price were both positive and negative depending on sector, the effect on the wellhead price for natural gas was a decrease.

In previous studies, the projected change in the natural gas price varies among the end use sectors. For example, in the analysis for residential furnaces, DOE estimated that natural gas prices would decrease for the industrial and electric power sectors, and increase for residential consumers. The increase in the residential price is believed to occur because the fixed charges (*e.g.,* transmission infrastructure costs) are spread over fewer million Btu of gas sales in the standards case, thus placing upward pressure on the average price per million Btu. A similar pattern could be expected to occur in the commercial sector.

Although the estimated reduction in average natural gas prices is small, the estimated economy-wide savings in natural gas expenditures over the 2012–2042 forecast period have an estimated net present value of $0.29 billion at a seven-percent discount rate.

In addition to conducting its own analysis using NEMS, DOE reviewed the results of: (1) Studies that used NEMS to investigate the price impact of reductions in natural gas demand, and (2) studies that used other energy-economic models to investigate the price impact of substantial change in natural gas demand. While the results vary considerably among the different studies, they generally show a price response similar to or larger than that shown by DOE's NEMS analysis.

In the short run, DOE's preliminary analysis indicates that consumer savings from lower natural gas prices would be offset by declines in gas producer revenue. In the long run, the previous analyses indicate that the reduction in natural gas prices mainly results from changes in gas extraction costs. Since there is only a limited supply of low-cost, conventional natural gas sources, natural gas extraction costs rise over time as these low-cost sources are depleted. Reduced gas demand puts downward pressure on extraction costs and prices by delaying the depletion of the low-cost reserves and the shift toward higher-cost sources. However, as changes in extraction costs are projected to occur in 2030 and beyond, the uncertainty of the actual savings that would be realized is increased.

Based on the discussed analysis, DOE recognizes that there is uncertainty about the magnitude, distribution, and timing of the costs, benefits, and net benefits within the economy. DOE's previous analyses indicated that the prices of natural gas to the end use consumers (residential) would increase slightly, due to fixed costs in the distribution of natural gas to the consumer becoming a higher fraction of the total cost. A similar effect is possible in the commercial sector with commercial boilers. While DOE has not been able to estimate these potential effects, DOE anticipates the effect will be small since the magnitude of the gas price change is small (but likely to vary as the natural gas savings increases).

Similarly, DOE is uncertain of the effects of the drop in natural gas on producers and distributors of natural gas. While their revenues and costs are expected to drop, it is uncertain whether they will drop in proportion over time. The supply side will likely experience revenue loss due to both the price changes and the reduction in gas sales that they will experience.

DOE considered the potential impact on natural gas prices in the establishment of the final standards, but because of the uncertainty of these impacts, and because DOE's analysis has not been subjected to public review, this factor had little impact on DOE's conclusion.

2. Effective Date of the Amended Energy Conservation Standards for Commercial Packaged Boilers

Generally, covered equipment must comply with the applicable standard if such equipment is manufactured or imported on or after a specified date. As explained in the March 2009 NOPR, DOE evaluated whether more-stringent efficiency levels than those in ASHRAE Standard 90.1–2007 would be technologically feasible and economically justified and result in a significant amount of additional energy savings. 74 FR 12003. Because DOE found that more stringent standards did not meet these requirements and is adopting energy conservation standards at the efficiency levels contained in ASHRAE Standard 90.1–2007, EPCA requires the standards to 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[NA] standard * * *''. (42 U.S.C. 6313(a)(6)(D)) Thus, for the equipment classes where a two-tier standard is set-forth, the effective date of the rulemaking depends on the effective date specified in ASHRAE Standard 90.1–2007. The effective date in ASHRAE Standard 90.1–2007 for commercial packaged boilers is March 2, 2010, for the initial efficiency level (which would require an effective date of March 2, 2012), and the effective date in ASHRAE Standard 90.1–2007 for the two commercial packaged boiler equipment classes with a tiered efficiency level is March 2, 2020 for the second tier efficiency level (which would require an effective date of March 2, 2022).

For analysis purposes, if DOE were to adopt 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 4-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 for which DOE might adopt a level more stringent than the ASHRAE efficiency levels, the rule would apply to products manufactured on or after July 2014, which is four years from the date of publication of the final rule.[18]

Table V.5 presents the anticipated effective dates of an amended energy conservation standard for each equipment class for which DOE developed a potential energy savings analysis.

TABLE V.5—ANTICIPATED EFFECTIVE DATE OF AN AMENDED ENERGY CONSERVATION STANDARD FOR EACH EQUIPMENT CLASS OF COMMERCIAL PACKAGED BOILERS

Equipment class	Anticipated effective date for adopting the efficiency levels in ASHRAE standard 90.1–2007	Anticipated effective date for adopting more stringent efficiency levels than those in ASHRAE standard 90.1–2007
Small Gas-Fired Hot Water Commercial Packaged Boilers	2012	2014
Small Gas-Fired Steam, All Except Natural Draft Commercial Packaged Boilers	2012	2014
Small Gas-Fired Steam Natural Draft Commercial Packaged Boilers	Tier 1: 2012 Tier 2: 2022.	2014
Small Oil-Fired Hot Water Commercial Packaged Boilers	2012	2014
Small Oil-Fired Steam Commercial Packaged Boilers	2012	2014
Large Gas-Fired Hot Water Commercial Packaged Boilers	2012	2014
Large Gas-Fired Steam, All Except Natural Draft Commercial Packaged Boilers	2012	2014
Large Gas-Fired Steam Natural Draft Commercial Packaged Boilers	Tier 1: 2012 Tier 2: 2022.	2014
Large Oil-Fired Hot Water Commercial Packaged Boilers	2012	2014
Large Oil-Fired Steam Commercial Packaged Boilers	2012	2014

VI. Analytical Results for Commercial Packaged Boilers

A. Efficiency Levels Analyzed

Table VI.1 presents the baseline efficiency level and the efficiency levels analyzed for each equipment class of commercial packaged boilers subject to today's final rule. The baseline efficiency levels correspond to the efficiency levels specified by ASHRAE Standard 90.1–2007 for commercial packaged boilers. The efficiency levels above the baseline represent efficiency levels above those specified in ASHRAE Standard 90.1–2007 where equipment is currently available on the market.

TABLE VI.1—EFFICIENCY LEVELS ANALYZED

Equipment class	Representative capacity (*kBtu/h*)	Efficiency levels analyzed
Small gas-fired hot water	800	Baseline—80% E_T 82% E_T 84% E_T 86% E_T Condensing—92% E_T
Small gas-fired steam, all except natural draft	800	Baseline—79% E_T 80% E_T 81% E_T 82% E_T 83% E_T
Small gas-fired steam natural draft	800	Baseline—77% E_T 78% E_T 79% E_T 80% E_T
Small oil-fired hot water	800	Baseline—82% E_T 84% E_T 86% E_T 88% E_T
Small oil-fired steam	800	Baseline—81% E_T 82% E_T 83% E_T 85% E_T
Large gas-fired hot water	3,000	Baseline—82% E_C 83% E_C 84% E_C 85% E_C Condensing—95% E_C

[18] Since ASHRAE published Standard 90.1–2007 on January 10, 2008, EPCA requires that DOE publish a final rule adopting more-stringent standards than those adopted in Standard 90.1–2007 within 30 months of ASHRAE action (*i.e.*, by July 2010). Thus, four years from July 2010 would be July 2014, which would be the anticipated effective date for DOE adoption of more-stringent standards.

TABLE VI.1—EFFICIENCY LEVELS ANALYZED—Continued

Equipment class	Representative capacity (*kBtu/h*)	Efficiency levels analyzed
Large gas-fired steam, all except natural draft	3,000	Baseline—79% E_T 80% E_T 81% E_T 82% E_T 83% E_T
Large gas-fired steam natural draft	3,000	Baseline—77% E_T 78% E_T 79% E_T 80% E_T 81% E_T
Large oil-fired hot water	3,000	Baseline—84% E_C 86% E_C 87% E_C 88% E_C
Large oil-fired steam	3,000	Baseline—81% E_T 82% E_T 83% E_T 84% E_T 86% E_T

B. Economic Justification and Energy Savings

1. Economic Impacts on Commercial Customers

To evaluate the economic impact of the efficiency levels on commercial customers, DOE conducted an LCC analysis for each efficiency level. More efficient commercial packaged boilers would affect these customers in two ways: (1) Annual operating expense would decrease; and (2) purchase price would increase. Inputs used for calculating the LCC include total installed costs (*i.e.,* equipment price plus installation costs), operating expenses (*i.e.,* annual energy savings, energy prices, energy price trends, repair costs, and maintenance costs), equipment lifetime, and discount rates.

The output of the LCC model is a mean LCC savings for each equipment class, relative to the baseline commercial packaged boiler efficiency level. The LCC analysis also provides information on the percentage of customers that are negatively affected by an increase in the minimum efficiency standard.

DOE also performed a PBP analysis as part of the LCC analysis. The PBP is the number of years it would take for the customer to recover the increased costs of higher-efficiency equipment as a result of energy savings based on the operating cost savings. The PBP is an economic benefit-cost measure that uses benefits and costs without discounting. Chapter 5 of the final rule TSD provides detailed information on the LCC and PBP analyses.

DOE's LCC and PBP analyses provided five key outputs for each efficiency level above the baseline (*i.e.,* efficiency levels more stringent than those in ASHRAE Standard 90.1–2007), reported in Table VI.2 through Table VI.11. The first three outputs are the proportion of commercial boiler purchases where the purchase of a commercial packaged boiler that is compliant with the amended energy conservation standard creates a net LCC increase, no impact, or a net LCC savings for the customer. The fourth output is the average net LCC savings from standard-compliant equipment. The fifth output is the average PBP for the customer investment in standard-compliant equipment. The sixth output is the increase in total installed cost from standard-compliant equipment.

TABLE VI.2—SUMMARY LCC AND PBP RESULTS FOR SMALL GAS-FIRED HOT WATER BOILERS, 800 KBTU/h OUTPUT CAPACITY

Small gas-fired hot water	Efficiency level			
	1	2	3	4
Thermal Efficiency (E_t)	82%	84%	86%	92%
Equipment with Net LCC Increase (%)	9	21	42	64
Equipment with No Change in LCC (%)	77	48	25	18
Equipment with Net LCC Savings (%)	14	31	33	19
Mean LCC Savings ($)	$1,700	$3,239	$1,329	($4,760)
Mean PBP (years)	25.4	30.6	42.7	56.7
Increase in Total Installed Cost ($)	$3,364	$5,526	$9,045	$14,323

*Numbers in parentheses indicate negative LCC savings.

TABLE VI.3—SUMMARY LCC AND PBP RESULTS FOR SMALL GAS-FIRED STEAM, ALL EXCEPT NATURAL DRAFT, 800 kBTU/h OUTPUT CAPACITY

Small gas-fired steam, all except natural draft	Efficiency level			
	1	2	3	4
Thermal Efficiency (E_t)	80%	81%	82%	83%
Equipment with Net LCC Increase (%)	27	58	71	73
Equipment with No Change in LCC (%)	64	19	10	7
Equipment with Net LCC Savings (%)	9	23	19	20
Mean LCC Savings ($)	($870)	($674)	($2,423)	($3,064)
Mean Payback Period (years)	41.6	41.8	50.7	50.8
Increase in Total Installed Cost ($)	$3,204	$4,946	$7,674	$9,831

* Numbers in parentheses indicate negative savings.

TABLE VI.4—SUMMARY LCC AND PBP RESULTS FOR SMALL GAS-FIRED STEAM NATURAL DRAFT BOILERS, 800 kBTU/h OUTPUT CAPACITY

Small gas-fired steam natural draft	Efficiency level		
	1	2	3
Thermal Efficiency (E_t)	78%	79%	80%
Equipment with Net LCC Increase (%)	44	35	43
Equipment with No Change in LCC (%)	32	22	3
Equipment with Net LCC Savings (%)	25	43	54
Mean LCC Savings * ($)	($50)	$1,657	$2,184
Mean PBP (years)	30.9	25.4	28.7
Increase in Total Installed Cost ($)	$2,875	$3,926	$5,562

* Numbers in parentheses indicate negative savings.

TABLE VI.5—SUMMARY LCC AND PBP RESULTS FOR SMALL OIL-FIRED HOT WATER BOILERS, 800 kBTU/h OUTPUT CAPACITY

Small oil-fired hot water	Efficiency level		
	1	2	3
Thermal Efficiency (E_t)	84%	86%	88%
Equipment with Net LCC Increase (%)	10	10	28
Equipment with No Change in LCC (%)	39	27	7
Equipment with Net LCC Savings (%)	51	63	65
Mean LCC Savings ($)	$4,902	$9,770	$11,482
Mean PBP (years)	16.5	17.5	24.0
Increase in Total Installed Cost ($)	$3,506	$5,912	$9,737

TABLE VI.6—SUMMARY LCC AND PBP RESULTS FOR SMALL OIL-FIRED STEAM BOILERS, 800 kBTU/h OUTPUT CAPACITY

Small oil-fired hot water	Efficiency level		
	1	2	3
Thermal Efficiency (E_t)	82%	83%	85%
Equipment with Net LCC Increase (%)	29	46	54
Equipment with No Change in LCC (%)	58	24	6
Equipment with Net LCC Savings (%)	13	30	40
Mean LCC Savings * ($)	($732)	$88	$864
Mean PBP (years)	35.1	33.7	35.0
Increase in Total Installed Cost ($)	$3,136	$4,739	$8,236

* Numbers in parentheses indicate negative savings.

TABLE VI.7—SUMMARY LCC AND PBP RESULTS FOR LARGE GAS-FIRED HOT WATER BOILERS, 3,000 kBTU/h OUTPUT CAPACITY

Large gas-fired hot water	Efficiency level			
	1	2	3	4
Combustion Efficiency (E_C)	83%	84%	85%	95%
Equipment with Net LCC Increase (%)	8	15	31	45
Equipment with No Change in LCC (%)	51	23	17	6

TABLE VI.7—SUMMARY LCC AND PBP RESULTS FOR LARGE GAS-FIRED HOT WATER BOILERS, 3,000 kBTU/h OUTPUT CAPACITY—Continued

Large gas-fired hot water	Efficiency level			
	1	2	3	4
Equipment with Net LCC Savings (%)	41	62	52	50
Mean LCC Savings ($)	$6,411	$11,303	$11,324	$13,271
Mean PBP (years)	15.3	19.3	28.7	38.3
Increase in Total Installed Cost ($)	$4,093	$7,742	$13,560	$37,293

TABLE VI.8—SUMMARY LCC AND PBP RESULTS FOR LARGE GAS-FIRED STEAM, ALL EXCEPT NATURAL DRAFT BOILERS, 3,000 kBTU/h OUTPUT CAPACITY

Large gas-fired steam, all except natural draft	Efficiency level			
	1	2	3	4
Thermal Efficiency (E_t)	80%	81%	82%	83%
Equipment with Net LCC Increase (%)	4	4	3	3
Equipment with No Change in LCC (%)	61	26	23	20
Equipment with Net LCC Savings (%)	34	70	74	77
Mean LCC Savings ($)	$7,876	$18,144	$27,941	$37,065
Mean Payback Period (years)	11.8	8.8	8.0	7.8
Increase in Total Installed Cost ($)	$3,969	$5,638	$7,398	$9,423

TABLE VI.9—SUMMARY LCC AND PBP RESULTS FOR LARGE GAS-FIRED STEAM NATURAL DRAFT BOILERS, 3,000 kBTU/h OUTPUT CAPACITY

Large gas-fired steam natural draft	Efficiency level			
	1	2	3	4
Thermal Efficiency (E_t)	78%	79%	80%	81%
Equipment with Net LCC Increase (%)	1	2	4	10
Equipment with No Change in LCC (%)	88	42	24	7
Equipment with Net LCC Savings (%)	12	55	72	83
Mean LCC Savings ($)	$9,531	$19,836	$28,016	$33,835
Mean Payback Period (years)	9.1	8.0	9.0	11.0
Increase in Total Installed Cost ($)	$3,410	$5,484	$8,635	$13,060

TABLE VI.10—SUMMARY LCC AND PBP RESULTS FOR LARGE OIL-FIRED HOT WATER BOILERS, 3,000 kBTU/h OUTPUT CAPACITY

Large oil-fired hot water	Efficiency level		
	1	2	3
Combustion Efficiency (E_C)	86%	87%	88%
Equipment with Net LCC Increase (%)	2	7	10
Equipment with No Change in LCC (%)	52	24	24
Equipment with Net LCC Savings (%)	46	69	66
Mean LCC Savings ($)	$26,820	$35,114	$42,551
Mean PBP (years)	8.4	11.8	14.3
Increase in Total Installed Cost ($)	$6,644	$12,067	$17,736

TABLE VI.11—SUMMARY LCC AND PBP RESULTS FOR LARGE OIL-FIRED STEAM BOILERS, 3,000 kBTU/h OUTPUT CAPACITY

Large oil-fired steam	Efficiency level			
	1	2	3	4
Thermal Efficiency (E_t)	82%	83%	84%	86%
Equipment with Net LCC Increase (%)	1	2	8	9
Equipment with No Change in LCC (%)	66	41	16	11
Equipment with Net LCC Savings (%)	33	57	77	81
Mean LCC Savings ($)	$13,940	$27,598	$37,978	$59,175
Mean Payback Period (years)	1	2	8	9
Increase in Total Installed Cost ($)	$3,885	$6,970	$11,724	$20,263

2. National Impact Analysis

a. Amount and Significance of Energy Savings

To estimate the energy savings through 2042 due to amended energy conservation standards, DOE compared the energy consumption of commercial boilers under the base case (*i.e.,* the ASHRAE 90.1–2007 efficiency levels) to energy consumption of boilers under higher efficiency standards. DOE examined up to four efficiency levels higher than those of ASHRAE Standard 90.1–2007. The amount of energy savings depends not only on the potential increase in energy efficiency resulting from the adoption of a standard, but also on the rate at which the stock of existing, less-efficient commercial boilers will be replaced over time after implementation of the amended energy conservation standard. Table VI.12 shows the forecasted national energy savings at each of the standard levels. DOE reports both undiscounted and discounted estimates of energy savings. Table VI.13 and Table VI.14 show the magnitude of the energy savings if they are discounted at rates of 7 percent and 3 percent, respectively. Each standard level considered in this rulemaking would result in significant energy savings, and the amount of savings increases with higher energy conservation standards. (See chapter 7 of the final rule TSD.)

TABLE VI.12—SUMMARY OF CUMULATIVE NATIONAL ENERGY SAVINGS FOR COMMERCIAL BOILERS

[Energy savings for units sold from 2012 to 2042, undiscounted]

Equipment class	National energy savings (quads)*			
	Efficiency level 1	Efficiency level 2	Efficiency level 3	Efficiency level 4
Small gas-fired hot water	0.023	0.076	0.147	0.223
Small gas-fired steam, all except natural draft	0.000	0.015	0.031	0.048
Small gas-fired steam natural draft	(0.006)	0.017	0.044	n/a
Small oil-fired hot water	0.016	0.036	0.060	n/a
Small oil-fired steam	0.010	0.028	0.071	n/a
Large gas-fired hot water	0.015	0.039	0.064	0.185
Large gas-fired steam, all except natural draft	0.023	0.066	0.110	0.155
Large gas-fired, steam natural draft	(0.023)	0.004	0.039	0.079
Large oil-fired hot water	0.014	0.025	0.036	n/a
Large oil-fired steam	0.041	0.112	0.209	0.431

*Numbers in parentheses indicate negative potential energy savings due to the delayed implementation of more-stringent efficiency levels compared to the efficiency levels specified in ASHRAE Standard 90.1–2007.

TABLE VI.13—SUMMARY OF CUMULATIVE NATIONAL ENERGY SAVINGS FOR COMMERCIAL BOILERS

[Energy savings for units sold from 2012 to 2042, discounted at seven percent]

Equipment class	National energy savings (quads)*			
	Efficiency level 1	Efficiency level 2	Efficiency level 3	Efficiency level 4
Small gas-fired hot water	0.005	0.015	0.030	0.045
Small gas-fired steam, all except natural draft	(0.000)	0.003	0.006	0.010
Small gas-fired steam natural draft	(0.000)	0.004	0.010	n/a
Small oil-fired hot water	0.003	0.007	0.012	n/a
Small oil-fired steam	0.002	0.006	0.015	n/a
Large gas-fired hot water	0.003	0.008	0.013	0.038
Large gas-fired steam, all except natural draft	0.005	0.014	0.023	0.032
Large gas-fired steam natural draft	(0.003)	0.002	0.009	0.018
Large oil-fired hot water	0.003	0.005	0.007	n/a
Large oil-fired steam	0.008	0.023	0.043	0.088

*Numbers in parentheses indicate negative potential energy savings due to the delayed implementation of more-stringent efficiency levels compared to the efficiency levels specified in ASHRAE Standard 90.1–2007.

TABLE VI.14—SUMMARY OF CUMULATIVE NATIONAL ENERGY SAVINGS FOR COMMERCIAL BOILERS

[Energy savings for units sold from 2012 to 2042, discounted at three percent]

Equipment class	National energy savings (quads)*			
	Efficiency level 1	Efficiency level 2	Efficiency level 3	Efficiency level 4
Small gas-fired hot water	0.011	0.037	0.071	0.108
Small gas-fired steam, all except natural draft	(0.000)	0.007	0.015	0.023
Small gas-fired, steam natural draft	(0.002)	0.009	0.022	n/a
Small oil-fired hot water	0.008	0.017	0.029	n/a
Small oil-fired steam	0.005	0.013	0.035	n/a
Large gas-fired hot water	0.007	0.019	0.031	0.090
Large gas-fired steam, all except natural draft	0.011	0.032	0.054	0.075
Large gas-fired steam, natural draft	(0.010)	0.003	0.020	0.040
Large oil-fired hot water	0.007	0.012	0.017	n/a

TABLE VI.14—SUMMARY OF CUMULATIVE NATIONAL ENERGY SAVINGS FOR COMMERCIAL BOILERS—Continued

[Energy savings for units sold from 2012 to 2042, discounted at three percent]

Equipment class	National energy savings (quads)*			
	Efficiency level 1	Efficiency level 2	Efficiency level 3	Efficiency level 4
Large oil-fired steam	0.020	0.054	0.101	0.209

* Numbers in parentheses indicate negative potential energy savings due to the delayed implementation of more-stringent efficiency levels compared to the efficiency levels specified in ASHRAE Standard 90.1–2007.

b. Net Present Value

The NPV analysis is a measure of the cumulative benefit or cost of standards to the Nation. In accordance with OMB's guidelines on regulatory analysis (OMB Circular A–4, section E (Sept. 17, 2003)), DOE calculated NPV using both a 7-percent and a 3-percent real discount rate. The 7-percent rate is an estimate of the average before-tax rate of return on private capital in the U.S. economy, and reflects the returns to real estate and small business capital as well as corporate capital. DOE used this discount rate to approximate the opportunity cost of capital in the private sector because recent OMB analysis has found the average rate of return on capital to be near this rate. DOE also used the 3-percent rate to capture the potential effects of standards on private customers' consumption (*e.g.,* reduced purchasing of equipment due to higher prices for equipment and purchase of reduced amounts of energy). This rate represents the rate at which society discounts future consumption flows to their present value. This rate can be approximated by the real rate of return on long-term government debt (*e.g.,* yield on Treasury notes minus annual rate of change in the Consumer Price Index), which has averaged about 3 percent on a pre-tax basis for the last 30 years. Table VI.15 and Table VI.16 provide an overview of the NPV results. (See chapter 7 of the final rule TSD.)

TABLE VI.15—SUMMARY OF CUMULATIVE NET PRESENT VALUE FOR BOILERS

[Discounted at seven percent]

Equipment class	Net present value (billion 2008$)			
	Efficiency level 1	Efficiency level 2	Efficiency level 3	Efficiency level 4
Small gas-fired hot water	($0.007)	($0.003)	($0.167)	($0.576)
Small gas-fired steam, all except natural draft	(0.036)	(0.039)	(0.082)	(0.120)
Small gas-fired steam natural draft	(0.033)	(0.011)	(0.023)	n/a
Small oil-fired hot water	0.020	0.057	0.048	n/a
Small oil-fired steam	(0.012)	0.004	0.019	n/a
Large gas-fired hot water	0.015	0.031	0.006	(0.098)
Large gas-fired steam, all except natural draft	0.032	0.137	0.240	0.338
Large gas-fired steam natural draft	(0.055)	(0.014)	0.004	(0.024)
Large oil-fired hot water	0.064	0.111	0.120	n/a
Large oil-fired steam	0.132	0.361	0.569	1.151

* Numbers in parentheses indicate negative NPV.

TABLE VI.16—SUMMARY OF CUMULATIVE NET PRESENT VALUE FOR BOILERS

[Discounted at three percent]

Equipment class	Net present value (billion 2008$)			
	Efficiency level 1	Efficiency level 2	Efficiency level 3	Efficiency level 4
Small gas-fired hot water	$0.092	$0.288	$0.139	($0.592)
Small gas-fired steam, all except natural draft	(0.072)	(0.010)	(0.035)	(0.065)
Small gas-fired, steam natural draft	(0.094)	0.049	0.132	n/a
Small oil-fired hot water	0.131	0.297	0.376	n/a
Small oil-fired steam	0.027	0.138	0.347	n/a
Large gas-fired hot water	0.100	0.231	0.264	0.470
Large gas-fired steam, all except natural draft	0.178	0.599	1.020	1.431
Large gas-fired steam natural draft	(0.264)	(0.057)	0.133	0.253
Large oil-fired hot water	0.210	0.356	0.422	n/a
Large oil-fired steam	0.496	1.330	2.240	4.552

* Numbers in parentheses indicate negative NPV.

3. Need of the Nation To Conserve Energy

Improving the energy efficiency of commercial packaged boilers would likely improve the security of the Nation's energy system by reducing overall demand for energy, thus reducing the Nation's reliance on foreign sources of energy. Energy savings for new energy conservation standards for equipment covered under this rule would also produce environmental benefits in the form of reduced emissions of air pollutants and greenhouse gases associated with energy production. Table VI.17 provides DOE's estimate of cumulative CO_2, NO_X, and SO_2 emissions reductions that would result from the adoption of new standards for commercial packaged boilers at the ASHRAE 90.1–2007 efficiency levels. Table VI.18 through Table VI.20 provide estimates of additional cumulative CO_2, NO_X, and SO_2 emissions reductions that would result from the adoption of new standards for commercial packaged boilers that exceed the ASHRAE 90.1–2007 efficiency levels. The expected energy savings from the amended standards for commercial packaged boilers may also reduce the cost of maintaining nationwide emissions standards and constraints. In the Environmental Impact Analysis (chapter 8 of the final rule TSD), DOE reports estimated annual changes in CO_2, NO_X, and SO_2 emissions attributable to each efficiency level analyzed.

TABLE VI.17—SUMMARY OF CUMULATIVE NATIONAL EMISSIONS IMPACTS FOR COMMERCIAL BOILERS FROM 2012 TO 2042 FOR ADOPTING ASHRAE STANDARD 90.1–2007

Equipment class	Cumulative national emissions impacts from 2012 to 2042		
	CO_2 (metric kilotons)	NO_X (short tons)	SO_2 (short tons)
Small gas-fired hot water	(674)	(1,177)	0
Small gas-fired steam, all except natural draft	(31)	(54)	0
Small gas-fired steam natural draft	(1,937)	(3,382)	0
Small oil-fired hot water	(677)	(837)	(2,628)
Small oil-fired steam	(327)	(404)	(1,267)
Large gas-fired hot water	(296)	(516)	0
Large gas-fired steam, all except natural draft	(177)	(308)	0
Large gas-fired steam natural draft	(1,525)	(2,662)	0
Large oil-fired hot water	0	0	0
Large oil-fired steam	0	0	0

TABLE VI.18—SUMMARY OF CUMULATIVE CO_2 EMISSIONS IMPACTS FOR COMMERCIAL BOILERS FROM 2012 TO 2042 FOR ADOPTION OF ANALYZED HIGHER STANDARDS OVER THE ASHRAE STANDARD 90.1–2007 LEVELS

Equipment class	Cumulative national CO_2 emissions impacts from 2012 to 2042, metric kilotons			
	Efficiency level 1	Efficiency level 2	Efficiency level 3	Efficiency level 4
Small gas-fired hot water	(1,227)	(4,039)	(7,858)	(11,880)
Small gas-fired steam, all except natural draft	4	(797)	(1,666)	(2,541)
Small gas-fired steam natural draft	332	(879)	(2,355)	n/a
Small oil-fired hot water	(1,171)	(2,596)	(4,342)	n/a
Small oil-fired steam	(704)	(2,026)	(5,189)	n/a
Large gas-fired hot water	(799)	(2,082)	(3,425)	(9,866)
Large gas-fired steam, all except natural draft	(1,217)	(3,533)	(5,889)	(8,281)
Large gas-fired steam natural draft	1,226	(206)	(2,054)	(4,240)
Large oil-fired hot water	(1,032)	(1,820)	(2,590)	n/a
Large oil-fired steam	(3,007)	(8,110)	(15,167)	(31,354)

TABLE VI.19—SUMMARY OF CUMULATIVE NO_X EMISSIONS IMPACTS FOR COMMERCIAL BOILERS FROM 2012 TO 2042 FOR ADOPTION OF ANALYZED HIGHER STANDARDS OVER THE ASHRAE STANDARD 90.1–2007 LEVELS

Equipment class	Cumulative national NO_X emissions impact from 2012 to 2042, short tons*			
	Efficiency level 1	Efficiency level 2	Efficiency level 3	Efficiency level 4
Small gas-fired hot water	(2,141)	(7,049)	(13,715)	(20,734)
Small gas-fired steam, all except natural draft	6	(1,392)	(2,907)	(4,434)
Small gas-fired steam natural draft	579	(1,534)	(4,110)	n/a
Small oil-fired hot water	(1,447)	(3,208)	(5,365)	n/a
Small oil-fired steam	(870)	(2,504)	(6,413)	n/a
Large gas-fired hot water	(1,395)	(3,634)	(5,978)	(17,219)
Large gas-fired steam, all except natural draft	(2,124)	(6,167)	(10,278)	(14,452)
Large gas-fired steam natural draft	2,140	(359)	(3,585)	(7,401)
Large oil-fired hot water	(1,276)	(2,250)	(3,201)	n/a
Large oil-fired steam	(3,716)	(10,022)	(18,743)	(38,746)

TABLE VI.20—SUMMARY OF CUMULATIVE SO_2 EMISSIONS IMPACTS FOR COMMERCIAL BOILERS FROM 2012 TO 2042 FOR ADOPTION OF ANALYZED HIGHER STANDARDS OVER THE ASHRAE STANDARD 90.1–2007 LEVELS

Equipment class	Cumulative national SO_2 emissions impacts from 2012 to 2042, short tons*			
	Efficiency level 1	Efficiency level 2	Efficiency level 3	Efficiency level 4
Small gas-fired hot water	0	0	0	0
Small gas-fired steam, all except natural draft	0	0	0	0
Small gas-fired steam natural draft	0	0	0	n/a
Small oil-fired hot water	(4,543)	(10,072)	(16,847)	n/a
Small oil-fired steam	(2,731)	(7,863)	(20,136)	n/a
Large gas-fired hot water	0	0	0	0
Large gas-fired steam, all except natural draft	0	0	0	0
Large gas-fired steam natural draft	0	0	0	0
Large oil-fired hot water	(4,005)	(7,064)	(10,051)	n/a
Large oil-fired steam	(11,667)	(31,469)	(58,854)	(121,663)

To put the potential monetary benefits from reduced CO_2 emissions into a form that would likely be most useful to decision makers and interested parties, DOE used the same methods it used to calculate the net present value of consumer cost savings. DOE converted the estimated yearly reductions in CO_2 emissions into monetary values that represented the present value, in that year, of future benefits resulting from that reduction in emissions, which were then discounted from that year to the present using both 3-percent and 7-percent discount rates.

In chapter 9 of the TSD, which accompanied the June 2009 NODA, DOE proposed to use the range $0 to $20 per ton for the year 2007 in 2007$. 74 FR 26596. These estimates were originally derived to represent the lower and upper bounds of the costs and benefits likely to be experienced in the United States and were also used in chapter 9 of the draft TSD for this rulemaking. 74 FR 26596–7 (June 3, 2009). The lower bound was based on an assumption of no benefit and the upper bound was based on an estimate of the mean value of worldwide impacts due to climate change that was reported by the Intergovernmental Panel on Climate Change (IPCC).[19] DOE expected that such domestic values would be 10% or less of comparable global values; however, there were no consensus estimates for the U.S. benefits likely to result from CO_2 emission reductions. Because U.S.-specific estimates were unavailable, DOE used the global mean value as an upper bound U.S. value.

Given the uncertainty surrounding estimates of the social cost of carbon, DOE previously concluded that relying on any single estimate may be inadvisable because that estimate will depend on many assumptions. Working Group II's contribution to the ''Fourth Assessment Report'' of the IPCC notes the following:

> The large ranges of SCC are due in the large part to differences in assumptions regarding climate sensitivity, response lags, the treatment of risk and equity, economic and non-economic impacts, the inclusion of potentially catastrophic losses, and discount rates.[20]

Because of this uncertainty, DOE used the SCC value from Tol (2005), which was presented in the IPCC's ''Fourth Assessment Report'' and provided a comprehensive meta-analysis of estimates for the value of SCC. 74 FR 16920, 17012 (April 13, 2009).

For today's final rule, DOE is relying on an updated range of values consistent with that presented in the Model Year 2011 fuel economy standard final rule issued by the National Highway Traffic Safety Administration (NHTSA): $2, $33 and $80 per metric ton (2007$). In the MY 2011 fuel economy standard final rule, NHTSA relied on a range of estimates representing the uncertainty surrounding global values of the SCC, while also encompassing, at the low end, possible domestic values. These three values encompass much of the variability in the estimates of the global value of the SCC. The lower end of this range, $2, also approximates possible mean value for domestic benefits. The middle of the range, $33, is equal to the mean value in Tol (2008) and the high end of the range, $80, represents one standard deviation above the mean global value. 74 FR 14196, 14346 (March 30, 2009). The global value of $33 is based on Tol's (2008) expanded and updated survey of 211 estimates of the global SCC.[21] Tol's 2008 survey encompasses a larger number of estimates for the global value of reducing carbon emissions than its previously-published counterpart, Tol (2005), and continues to represent the only recent, publicly-available compendium of peer-reviewed estimates of the SCC that has itself been peer-reviewed and published.

The domestic value ($2) was developed by NHTSA by using the mean estimate of the global value of reduced economic damages from climate change resulting from reducing CO_2 emissions as a starting point; estimating the fraction of the reduction in global damages that is likely to be experienced within the U.S.; and applying this fraction to the mean estimate of global benefits from reducing emissions to obtain an estimate of the U.S. domestic benefits from lower GHG emissions. NHTSA constructed the estimate of the U.S. domestic benefits from reducing CO_2

[19] During the preparation of its review of the state of climate science, the IPCC identified various estimates of the present value of reducing CO_2 emissions by 1 ton over the life that these emissions would remain in the atmosphere. The estimates reviewed by the IPCC spanned a range of values. Absent a consensus on any single estimate of the monetary value of CO_2 emissions, DOE used the estimates identified by the study cited in ''Summary for Policymakers,'' prepared by Working Group II of the IPCC's ''Fourth Assessment Report,'' to estimate the potential monetary value of CO_2 reductions likely to result from standards considered in this rulemaking. According to IPCC, the mean social cost of carbon (SCC) reported in studies published in peer-reviewed journals was $43 per ton of carbon. This translates into about $12 per ton of CO_2. The literature review (Tol 2005) from which this mean was derived did not report the year in which these dollars were denominated. However, DOE understands this estimate was for the year 1995 denominated in 1995$. Updating that estimate to 2007$ yields a SCC for the year 1995 of $15 per ton of CO_2.

[20] ''Climate Change 2007—Impacts, Adaptation and Vulnerability.'' Contribution of Working Group II to the ''Fourth Assessment Report'' of the IPCC, 17. Available at *http://www.ipcc.ch/ipccreports/ar4-wg2.htm* (last accessed Aug. 7, 2008).

[21] Richard S.J. Tol (2008), The social cost of carbon: Trends, outliers, and catastrophes, Economics—the Open-Access, Open-Assessment E-Journal, 2 (25), 1–24.

emissions using estimates of U.S. domestic and global benefits from reducing greenhouse gas emissions developed by EPA and reported in EPA's Technical Support Document accompanying its advance notice of proposed rulemaking on motor vehicle CO_2 emissions.[22]

A complete discussion of NHTSA's analysis is available in Chapter VIII of the Final Regulatory Analysis of the Corporate Average Fuel Economy for MY 2011 Passenger Cars and Light Trucks (NHTSA, March 2009).

After considering comments and the currently available information and analysis, which was reflected in the approach employed by NHTSA, DOE concluded that it was appropriate to consider the global benefits of reducing CO_2 emissions, as well as the domestic benefits. Consequently, DOE considered in its decision-process for this final rule the potential benefits resulting from reduced CO_2 emissions valued at $2, $33 and $80. The resulting range is based on current peer-reviewed estimates of the value of SCC and, DOE believes, fairly represents the uncertainty surrounding the global benefits resulting from reduced CO_2 emissions and, at the $2 level, also encompasses the likely domestic benefits, DOE also concluded, based on the most recent Tol analysis, that it was appropriate to escalate these values at 3% per year to represent the expected increases, over time, of the benefits associated with reducing CO_2 and other greenhouse gas emissions.

DOE also investigated the potential monetary benefit of reduced NO_X, and SO_2, emissions from the TSLs it considered. As previously stated DOE estimated the monetized value of NO_X emissions reductions resulting from each of the TSLs considered for today's final rule based on environmental damage estimates from the literature. Available estimates suggest a very wide range of monetary values for NO_X emissions, ranging from $370 per ton to $3,800 per ton of NO_X from stationary sources, measured in 2001$ (equivalent to a range of $432 to $4,441 per ton in 2007$ ($443 to $4,546 in 2008$). DOE estimated a low end monetary value for SO_2 emissions based on an SO_2 trading price as developed in the National Energy Modeling System (NEMS) electricity market model for the western and eastern U.S. DOE used a simple average of the trading prices from the eastern and western electricity market models for the period from 2012–2030, and extrapolated the prices out through 2042. These range in SO_2 costs from this source varied both by year and region from $86 to $1,012 per ton in 2007$ ($89 to $1,037 in 2008$). For an upper range estimated DOE used an estimate of environmental damage costs of $7,300 per ton of SO_2 from stationary sources, measured in 2001$ or $8,542 per ton in 2007$ ($8,733 in 2008$). These low and high values for the value of emissions for CO_2, NO_X, and SO_2 were in turn multiplied by the annual emissions of each pollutant for the period from 2012–2042, and the monetary values were converted to present value using three and seven percent discount rates.

Table VI.21 through Table VI.22 shows the resulting estimates of the potential range of present value benefits associated with the reduced CO_2, NOx, and SO_2 emissions for each class of commercial boiler for adoption of the ASHRAE 90.1–2007 efficiency levels.

BILLING CODE 6450–01–P

[22] U.S. EPA, Technical Support Document on Benefits of Reducing GHG Emissions, June 12, 2008.

Table VI.21. Cumulative Present Value for Emissions Reductions from Commercial Boilers from 2012 to 2042 for Adopting ASHRAE Standard 90.1-2007, Seven Percent Discount Rate*

Equipment Class	Cumulative National Emissions Impacts from 2012 to 2042						
	CO_2 (Thousand 2008$)			NO_X (Thousand 2008$)		SO_2 (Thousand 2008$)	
	Low	Med	High	Low	High	Low	High
Small, Gas-fired, Hot Water	$581	$9,582	$23,228	$103	$1,053	$0	$0
Small, Gas-fired, Steam, All Except natural Draft	$26	$437	$1,058	$5	$48	$0	$0
Small, Gas-fired, Steam, Natural Draft	$1,529	$25,230	$61,164	$249	$2,552	$0	$0
Small, Oil-fired, Hot Water	$583	$9,621	$23,324	$73	$749	$271	$4,980
Small, Oil-fired, Steam	$281	$4,640	$11,248	$35	$361	$131	$2,402
Large, Gas-fired, Hot Water	$255	$4,202	$10,186	$45	$462	$0	$0
Large, Gas-fired, Steam, All Except Natural Draft	$152	$2,510	$6,085	$27	$276	$0	$0
Large, Gas-fired, Steam, Natural Draft	$1,144	$18,877	$45,761	$176	$1,806	$0	$0
Large, Oil-fired, Hot Water	$0	$0	$0	$0	$0	$0	$0
Large, Oil-fired, Steam	$0	$0	$0	$0	$0	$0	$0

* The range of costs for carbon were low (2$/metric ton), medium ($33/metric ton) and high ($80/metric ton) all expressed in 2007$. Analysis results express in 2008$.

Table VI.22. Cumulative Present Value for Emissions Reductions from Commercial Boilers from 2012 to 2042 for Adopting ASHRAE Standard 90.1-2007, Three Percent Discount Rate*

Equipment Class	Cumulative National Emissions Impacts from 2012 to 2042						
	CO_2 (Thousand 2008$)			NO_X (Thousand 2008$)		SO_2 (Thousand 2008$)	
	Low	Med	High	Low	High	Low	High
Small, Gas-fired, Hot Water	$1,420	$23,437	$56,817	$235	$2,407	$0	$0
Small, Gas-fired, Steam, All Except natural Draft	$65	$1,068	$2,589	$11	$110	$0	$0
Small, Gas-fired, Steam, Natural Draft	$4,080	$67,328	$163,219	$631	$6,476	$0	$0
Small, Oil-fired, Hot Water	$1,426	$23,533	$57,051	$167	$1,711	$589	$11,381
Small, Oil-fired, Steam	$688	$11,349	$27,513	$80	$825	$284	$5,488
Large, Gas-fired, Hot Water	$623	$10,278	$24,916	$103	$1,056	$0	$0
Large, Gas-fired, Steam, All Except Natural Draft	$372	$6,140	$14,885	$61	$631	$0	$0
Large, Gas-fired, Steam, Natural Draft	$3,212	$53,006	$128,499	$479	$4,910	$0	$0
Large, Oil-fired, Hot Water	$0	$0	$0	$0	$0	$0	$0
Large, Oil-fired, Steam	$0	$0	$0	$0	$0	$0	$0

* * The range of costs for carbon were low (2$/ metric ton), medium ($33/ metric ton) and high ($80/ metric ton) all expressed in 2007$. Analysis results express in 2008$.

Table VI.23 through Table VI.26 show the potential range of present value benefits associated with the reduction of each emission for adoption of efficiency levels higher than the ASHRAE 90.1–2007 levels.

Table VI.23. Cumulative Present Value of CO_2 Emissions Reductions for Commercial Boilers from 2012 to 2042 for Adoption of Higher Standards over ASHRAE 90.1-2007, Seven Percent Discount Rate ($)*

	Cumulative National Present Value of CO_2 Emissions Reductions from 2012 to 2042, Seven Percent Discount Rate ($)*											
Equipment Class	Efficiency Level 1			Efficiency Level 2			Efficiency Level 3			Efficiency Level 4		
	$2/ton	$33/ton	$80/ton	$2/ton	$33/ton	$80/ton	$2/ton	$33/ton	$80/ton	$2/ton	$33/ton	$80/ton
Small gas-fired hot water	$1,008	$16,632	$40,320	$3,360	$55,440	$134,400	$6,555	$108,160	$262,206	$9,919	$163,664	$396,762
Small gas-fired steam, all except natural draft	($4)	($63)	($152)	$666	$10,993	$26,650	$1,392	$22,974	$55,695	$2,124	$35,052	$84,975
Small gas-fired, steam natural draft	($177)	($2,924)	($7,088)	$836	$13,790	$33,430	$2,070	$34,155	$82,800	($1,677)	n/a	n/a
Small oil-fired hot water	$961	$15,858	$38,443	$2,153	$35,524	$86,120	$3,613	$59,620	$144,534	($640)	n/a	n/a
Small oil-fired steam	$580	$9,567	$23,193	$1,686	$27,824	$67,452	$4,332	$71,478	$173,280	($308)	n/a	n/a
Large gas-fired hot water	$661	$10,902	$26,429	$1,734	$28,603	$69,341	$2,857	$47,145	$114,291	$8,244	$136,033	$329,777
Large gas-fired steam, all except natural draft	$1,013	$16,720	$40,533	$2,951	$48,688	$118,032	$4,921	$81,197	$196,841	$6,922	$114,210	$276,873
Large gas-fired steam natural draft	($878)	($14,487)	($35,119)	$329	$5,433	$13,170	$1,888	$31,146	$75,507	$3,731	$61,561	$149,240
Large oil-fired hot water	$863	$14,246	$34,535	$1,523	$25,125	$60,910	$2,167	$35,752	$86,672	$0	n/a	n/a
Large oil-fired steam	$2,515	$41,499	$100,604	$6,784	$111,932	$271,351	$12,687	$209,337	$507,484	$26,227	$432,742	$1,049,071

* Costs for carbon are expressed in 2007$/metric ton. Results expressed in 2008$. Numbers in parentheses indicate negative NPV.

Table VI.24. Cumulative Present Value of CO_2 Emissions Reductions for Commercial Boilers from 2012 to 2042 for Adoption of Higher Standards over ASHRAE 90.1-2007, Three Percent Discount Rate ($)*

	Cumulative National Present Value of CO_2 Emissions Reductions from 2012 to 2042, Three Percent Discount Rate ($)											
Equipment Class	Efficiency Level 1			Efficiency Level 2			Efficiency Level 3			Efficiency Level 4		
	$2/ton	$33/ton	$80/ton	$2/ton	$33/ton	$80/ton	$2/ton	$33/ton	$80/ton	$2/ton	$33/ton	$80/ton
Small gas-fired hot water	$2,584	$42,631	$103,347	$8,506	$140,341	$340,221	$16,550	$273,081	$662,014	$25,020	$412,830	$1,000,800
Small gas-fired steam, all except natural draft	($7)	($123)	($299)	$1,680	$27,713	$67,183	$3,508	$57,879	$140,312	$5,351	$88,290	$214,035
Small gas-fired, steam natural draft	($699)	($11,534)	($27,961)	$1,851	$30,549	$74,057	$4,959	$81,823	$198,360	($4,476)	n/a	n/a
Small oil-fired hot water	$2,466	$40,684	$98,629	$5,467	$90,201	$218,669	$9,144	$150,871	$365,747	($1,565)	n/a	n/a
Small oil-fired steam	$1,482	$24,453	$59,281	$4,268	$70,421	$170,718	$10,929	$180,333	$437,171	($755)	n/a	n/a
Large gas-fired hot water	$1,684	$27,780	$67,344	$4,385	$72,349	$175,390	$7,214	$119,033	$288,564	$20,778	$342,836	$831,117
Large gas-fired steam, all except natural draft	$2,563	$42,295	$102,534	$7,442	$122,786	$297,662	$12,402	$204,636	$496,087	$17,440	$287,757	$697,592
Large gas-fired steam natural draft	($2,582)	($42,608)	($103,292)	$433	$7,150	$17,333	$4,326	$71,381	$173,046	$8,931	$147,356	$357,227
Large oil-fired hot water	$2,174	$35,868	$86,952	$3,834	$63,261	$153,359	$5,456	$90,017	$218,222	$0	n/a	n/a
Large oil-fired steam	$6,333	$104,487	$253,301	$17,080	$281,824	$683,210	$31,944	$527,071	$1,277,747	$66,034	$1,089,561	$2,641,360

* Costs for carbon are expressed in 2007$/metric ton. Results expressed in 2008$. Numbers in parentheses indicate negative NPV.

Table VI.25. Cumulative Present Value of NO_X Emissions Reductions for Commercial Boilers from 2012 to 2042 for Adoption of Higher Standards over ASHRAE 90.1 - 2007

	Cumulative National Present Value of NO_X Emissions Reductions from 2012 to 2042, Seven Percent Discount Rate ($)*			
Equipment Class	Efficiency Level 1	Efficiency Level 2	Efficiency Level 3	Efficiency Level 4
Small gas-fired hot water	165 - 1,700	165 - 1,700	1,091 - 11,241	1,652 - 17,027
Small gas-fired steam, all except natural draft	(1) - (8)	(1) - (8)	232 - 2,393	354 - 3,652
Small gas-fired, steam natural draft	(15) - (156)	(15) - (156)	360 - 3,709	n/a
Small oil-fired hot water	111 - 1,147	111 - 1,147	425 - 4,376	n/a
Small oil-fired steam	67 - 695	67 - 695	511 - 5,264	n/a
Large gas-fired hot water	109 - 1,122	109 - 1,122	475 - 4,900	1,374 - 14,165
Large gas-fired steam, all except natural draft	168 - 1,734	168 - 1,734	820 - 8,455	1,154 - 11,896
Large gas-fired steam natural draft	(125) - (1,284)	(125) - (1,284)	340 - 3,501	649 - 6,690
Large oil-fired hot water	102 - 1,051	102 - 1,051	256 - 2,639	n/a
Large oil-fired steam	297 - 3,063	297 - 3,063	1,499 - 15,450	3,099 - 31,939
	Cumulative National Present Value of NO_X Emissions Reductions from 2012 to 2042, Three Percent Discount Rate ($)			
Equipment Class	Efficiency Level 1	Efficiency Level 2	Efficiency Level 3	Efficiency Level 4
Small gas-fired hot water	401 - 4,133	1,332 - 13,732	2,598 - 26,771	3,930 - 40,500
Small gas-fired steam, all except natural draft	(1) - (15)	264 - 2,720	551 - 5,683	841 - 8,671
Small gas-fired, steam natural draft	(80) - (821)	321 - 3,313	810 - 8,350	n/a
Small oil-fired hot water	271 - 2,791	605 - 6,235	1,014 - 10,455	n/a
Small oil-fired steam	163 - 1,682	473 - 4,879	1,215 - 12,524	n/a
Large gas-fired hot water	262 - 2,705	687 - 7,083	1,132 - 11,669	3,265 - 33,655
Large gas-fired steam, all except natural draft	402 - 4,141	1,169 - 12,048	1,949 - 20,088	2,741 - 28,254
Large gas-fired steam natural draft	(362) - (3,728)	115 - 1,190	731 - 7,539	1,460 - 15,048
Large oil-fired hot water	242 - 2,495	427 - 4,400	608 - 6,261	n/a
Large oil-fired steam	705 - 7,268	1,902 - 19,602	3,557 - 36,661	7,353 - 75,785

* Numbers in parentheses indicate negative NPV.

Table VI.26. Cumulative Present Value of SO_2 Emissions Reductions for Commercial Boilers from 2012 to 2042 for Adoption of Higher Standards over ASHRAE 90.1 - 2007

	Cumulative National Present Value of SO_2 Emissions Reductions from 2012 to 2042, Seven Percent Discount Rate ($)*			
Equipment Class	Efficiency Level 1	Efficiency Level 2	Efficiency Level 3	Efficiency Level 4
Small gas-fired hot water	0 - 0	0 - 0	0 – 0	0 - 0
Small gas-fired steam, all except natural draft	0 – 0	0 - 0	0 – 0	0 - 0
Small gas-fired, steam natural draft	0 – 0	0 - 0	0 – 0	n/a
Small oil-fired hot water	403 - 7,631	919 - 17,293	1,552 - 29,131	n/a
Small oil-fired steam	245 - 4,623	724 - 13,593	1,871 - 35,038	n/a
Large gas-fired hot water	0 – 0	0 - 0	0 – 0	0 - 0
Large gas-fired steam, all except natural draft	0 – 0	0 - 0	0 – 0	0 - 0
Large gas-fired steam natural draft	0 – 0	0 - 0	0 – 0	0 - 0
Large oil-fired hot water	374 - 6,998	660 - 12,343	939 - 17,564	n/a
Large oil-fired steam	1,090 - 20,387	2,940 - 54,989	5,499 - 102,842	11,367 - 212,594
	Cumulative National Present Value of SO_2 Emissions Reductions from 2012 to 2042, Three Percent Discount Rate ($)			
Equipment Class	Efficiency Level 1	Efficiency Level 2	Efficiency Level 3	Efficiency Level 4
Small gas-fired hot water	0 – 0	0 - 0	0 – 0	0 - 0
Small gas-fired steam, all except natural draft	0 – 0	0 - 0	0 - 0	0 - 0
Small gas-fired, steam natural draft	0 – 0	0 - 0	0 - 0	n/a
Small oil-fired hot water	936 - 18,576	2,103 - 41,502	3,533 - 69,591	n/a
Small oil-fired steam	565 - 11,196	1,649 - 32,478	4,239 - 83,366	n/a
Large gas-fired hot water	0 – 0	0 - 0	0 - 0	0 - 0
Large gas-fired steam, all except natural draft	0 – 0	0 - 0	0 - 0	0 - 0
Large gas-fired steam natural draft	0 – 0	0 - 0	0 - 0	0 - 0
Large oil-fired hot water	845 - 16,606	1,491 - 29,289	2,122 - 41,676	n/a
Large oil-fired steam	2,463 - 48,376	6,642 - 130,480	12,423 - 244,025	25,680 - 504,448

* Numbers in parentheses indicate negative NPV.

BILLING CODE 6450–01–C

C. Amended Energy Conservation Standards for Commercial Packaged Boilers

EPCA specifies that, for any commercial and industrial equipment addressed in section 342(a)(6)(A)(i) of EPCA, DOE may prescribe an energy conservation standard more stringent than the level for such equipment in ASHRAE/IESNA Standard 90.1, as amended, only if ''clear and convincing evidence'' shows that a more-stringent standard ''would result in significant additional conservation of energy and is technologically feasible and economically justified.'' (42 U.S.C. 6313(a)(6)(A)(ii)(II))

In evaluating more-stringent efficiency levels for commercial packaged boilers than those specified by ASHRAE Standard 90.1–2007, DOE reviewed the results in terms of their technological feasibility, economic justification, and significance of energy savings.

DOE first examined the potential energy savings that would result from the efficiency levels specified in ASHRAE Standard 90.1–2007 and compared that to the potential energy savings that would result from proposing efficiency levels more stringent than those in ASHRAE Standard 90.1–2007 as Federal energy conservation standards. All of the efficiency levels examined by DOE resulted in cumulative energy savings, including the efficiency levels in ASHRAE Standard 90.1–2007. DOE estimates that a total of 0.11 quads of energy will be saved if DOE adopts the efficiency levels for each commercial boiler equipment class specified in ASHRAE Standard 90.1–2007. If DOE were to propose efficiency levels more stringent than those specified by ASHRAE Standard 90.1–2007 as Federal minimum standards, the potential additional energy savings ranges from 0.11 quads to 1.12 quads. Associated with proposing more-stringent efficiency levels is a two-year delay in implementation compared to the adoption of energy conservation standards at the level specified in ASHRAE Standard 90.1–2007 (see section V.H.1). This two-year delay in implementation of amended energy conservation standards would result in a small amount of energy savings being lost in the first two years (2012 and 2013) compared to the savings from adopting the levels in ASHRAE Standard 90.1–2007; however, this energy savings may be compensated for by increased savings from higher standards in later years.

In addition to energy savings, DOE also examined the economic justification of proposing efficiency levels more stringent than those specified in ASHRAE Standard 90.1–2007. As shown in section VI.B.1, higher efficiency levels result in a positive mean LCC savings for some commercial packaged boiler equipment classes. For example, in the largest commercial packaged boiler equipment class (*i.e.,* small, gas-fired hot water boilers), the mean LCC impact ranges from $1,700 LCC savings to a mean LCC cost of $4,760 for efficiency level 1 through efficiency level 4 respectively. The total installed cost increases range from $3,364 to $14,323 for efficiency level 1 through efficiency level 4 when compared to the baseline. Overall, there would be a wide range of commercial customer LCC impacts based on climate, hydronic system operating temperature, and installation costs, which might place a significant burden on some commercial customers.

In general, there is a large range in the total installed cost of different types of commercial boiler equipment, leading to a high variance and uncertainty in the economic analyses. Many factors affect the cost of a commercial boiler, including the type of commercial packaged boilers, the material of the heat exchanger being used, and the overall design. In addition, the installation costs of boilers vary greatly depending on the efficiency, the location of the boiler, and the venting system. In more efficient boilers, the flue must be made out of corrosion-resistant materials to prevent the possibility of corrosion caused due to condensing flue gases. Because the mean LCC savings can be considered small in comparison to the total installed cost of the equipment, a relatively minor change in the differential installed cost estimate could negate the mean LCC savings realized by proposing more-stringent efficiency levels as Federal minimum standards for commercial packaged boilers.

After examining the potential energy savings and the economic justification of proposing efficiency levels more stringent than those specified in ASHRAE Standard 90.1–2007, DOE believes there are several other factors it should consider before proposing amended energy conservation standards for commercial packaged boilers.

First, DOE reexamined the certainty in its analysis of commercial packaged boilers. Due to current test procedure requirements, which are based on combustion, rather than thermal efficiency, not all manufacturers test for the thermal efficiency of their commercial boiler models, nor do they all report it to the I=B=R Directory or in manufacturers' catalogs. Some manufacturers simply do not report thermal efficiency, and of those manufacturers that do report thermal efficiency, some may estimate the thermal efficiency ratings of their equipment, rather than actually test for the thermal efficiency of their equipment. DOE has no way to determine which thermal efficiency ratings are the result of estimation and which are the result of actual testing. Further, in the case of manufacturers that do test for thermal efficiency, variances in testing facilities and equipment can lead to inconsistent results in the thermal efficiency testing among the manufacturers. The combination of these factors leads to concerns about the viability of using the data from the I=B=R Directory and manufacturers' catalogs as the source for thermal efficiency ratings for the basis of this analysis. Such concerns are heightened the further one moves away from the consensus efficiency levels in ASHRAE Standard 90.1–2007 in the context of this standard-setting rulemaking.

Because ASHRAE Standard 90.1–2007 has switched to a thermal efficiency metric for certain commercial packaged boiler equipment classes, a one-time conversion in the DOE efficiency metric will be required at some point. The transition to a thermal efficiency metric will require manufacturers to test for and report thermal efficiency for 8 out of 10 commercial boiler equipment classes. This would mitigate the problem of uncertainty in the thermal efficiency ratings for those equipment classes, allowing DOE to be able to make more definitive comparisons with future versions of ASHRAE Standard 90.1. DOE believes that an earlier transition to a rated thermal efficiency across the industry will provide additional, near-term benefits covering the entire industry that are not captured in the DOE analysis presented. These benefits may include more rapid exposure of purchasers to the rated thermal efficiency of competing products, which lays the groundwork for assessing the benefits of one boiler against another in the marketplace and will create greater competition among manufacturers to provide customers with additional purchasing choices. DOE has no information with which to calculate this benefit.

Second, DOE notes the efficiency levels in ASHRAE Standard 90.1–2007 are part of a consensus agreement between the trade association representing the manufacturers and several energy-efficiency advocacy groups. DOE strongly encourages stakeholders to work together to propose agreements to DOE. When DOE receives a consensus agreement, DOE takes careful consideration to review the agreement resulting from groups that commonly have conflicting goals. DOE also points out that the Joint Letter submitted by AHRI, ACEEE, ASAP, ASE, and NRDC urged DOE to adopt as Federal minimum energy conservation standards the efficiency levels in ASHRAE Standard 90.1–2007 for commercial packaged boilers. (The Joint Letter, No. 5 at p. 1) DOE believes this negotiated agreement was made in good faith, and DOE is hesitant to second guess the outcome based on a limited analysis with many uncertainties. DOE presented these efficiency levels for public comment and, as discussed earlier, commenters supported the adoption of these levels.

Third, DOE has not assessed any likely change in the efficiencies of models currently on the boiler market in the absence of setting more-stringent standards. DOE recognizes that manufacturers would continue to make future improvements in the boiler efficiencies even in the absence of mandated energy conservation standards. Such ongoing technological developments could have a disproportionately larger impact on the analytical results for the more-stringent efficiency levels analyzed in terms of reduced energy benefits as compared to the ASHRAE Standard 90.1–2007 efficiency level scenario. When manufacturers introduce a new product line, they typically introduce higher-efficiency models, while maintaining their baseline product offering (*i.e.,* equipment at the ASHRAE Standard 90.1–2007 efficiency levels). Any introduction of higher-efficiency equipment and subsequent purchase by commercial customers, who usually buy higher-efficiency equipment, could reduce the energy savings benefits of more-stringent efficiency levels.

Fourth, DOE believes there could be a possible difference in life expectancy between the commercial packaged boilers at the ASHRAE Standard 90.1–2007 efficiency levels and those at more-stringent efficiency levels, including condensing boilers. DOE did not have any information to quantify these differences and did not receive any additional comments from interested parties regarding these potential differences in expected lifetime in response to the March 2009 NOPR.

Finally, DOE also recognizes that commercial packaged boilers are one component in a hydronic system. Unlike most of the other residential appliances and commercial equipment for which DOE mandates energy conservation standards, the design and operation of that hydronic system (*i.e.,* the hot-water distribution system) can result in significant variances in the annual field efficiencies of the commercial packaged boilers compared to the rated efficiency levels of these units. DOE recognizes that as a result, a critical piece of information needed to ensure that the benefits of high nominal efficiency commercial packaged boilers are actually achieved in the field is not captured in the DOE analysis.

After weighing the benefits and burdens of adopting the ASHRAE Standard 90.1–2007 efficiency levels as Federal standards for commercial packaged boilers as compared to those for proposing more-stringent efficiency levels, DOE is adopting the efficiency levels in ASHRAE 90.1–2007 as amended energy conservation standards for all ten commercial packaged boilers equipment classes. DOE must have ''clear and convincing'' evidence to adopt efficiency levels more stringent than those specified in ASHRAE 90.1–2007, and for the reasons explained in this notice, the totality of information does not meet the ''clear and convincing'' standard that would justify more stringent efficiency levels. Given the relatively small mean LCC savings (in comparison to the total installed cost), even a slight alteration in DOE's installation estimates could result in the potential for negative mean LCC savings. In addition, the uncertainty of the thermal efficiency values reported may have resulted in an imprecise estimate of the efficiency of some equipment, leading to even greater uncertainty in the economic benefits of more-stringent standards.

DOE recognizes that the thermal efficiency metric is superior to the combustion efficiency metric because thermal efficiency is a more complete measure of boiler efficiency than the combustion efficiency metric (thermal efficiency accounts for jacket losses and combustion efficiency does not). DOE believes that once commercial packaged boilers are transitioned from the combustion efficiency metric to the thermal efficiency metric, the thermal efficiency ratings of certified equipment will be more accurate and consistent. The efficiency levels in ASHRAE Standard 90.1–2007 are an acceptable foundation that will allow the commercial boiler industry to begin the transition from using combustion efficiency to a thermal efficiency metric. DOE also takes into account the consensus nature of the efficiency levels in ASHRAE Standard 90.1–2007 for commercial packaged boilers.

Therefore, based on the discussion above, DOE has concluded that the efficiency levels beyond those in ASHRAE Standard 90.1–2007 for commercial packaged boilers are not economically justified and is adopting as Federal minimum standards the efficiency levels in ASHRAE Standard 90.1–2007 for all ten equipment classes of commercial packaged boilers. Table VI.27 shows the amended energy conservation standards for commercial packaged boilers.

TABLE VI.27—AMENDED ENERGY CONSERVATION STANDARDS FOR COMMERCIAL PACKAGED BOILERS *

Equipment type	Subcategory	Size category (input)	Efficiency level **
Hot Water Commercial Packaged Boilers	Gas-fired	≥300,000 Btu/h and ≤2,500,000 Btu/h	80% E_T
Hot Water Commercial Packaged Boilers	Gas-fired	>2,500,000 Btu/h	82% E_C
Hot Water Commercial Packaged Boilers	Oil-fired	≥300,000 Btu/h and ≤2,500,000 Btu/h	82% E_T
Hot Water Commercial Packaged Boilers	Oil-fired	>2,500,000 Btu/h	84% E_C
Steam Commercial Packaged Boilers	Gas-fired—all, except natural draft	≥300,000 Btu/h and ≤2,500,000 Btu/h	79% E_T
Steam Commercial Packaged Boilers	Gas-fired—all, except natural draft	>2,500,000 Btu/h	79% E_T
Steam Commercial Packaged Boilers	Gas-fired—natural draft	≥300,000 Btu/h and ≤2,500,000 Btu/h	77% E_T 79% E_T
Steam Commercial Packaged Boilers	Gas-fired—natural draft	>2,500,000 Btu/h	77% E_T 79% E_T
Steam Commercial Packaged Boilers	Oil-fired	≥300,000 Btu/h and ≤2,500,000 Btu/h	81% E_T

TABLE VI.27—AMENDED ENERGY CONSERVATION STANDARDS FOR COMMERCIAL PACKAGED BOILERS *—Continued

Equipment type	Subcategory	Size category (input)	Efficiency level **
Steam Commercial Packaged Boilers	Oil-fired	>2,500,000 Btu/h	81% E_T

* E_T is the thermal efficiency and E_C is the combustion efficiency.
** The effective date for the amended energy conservation standards is March 2, 2012. Where the table indicates a two-tier efficiency level, the second efficiency level is effective March 2, 2022.

D. Amended Energy Conservation Standards for 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

DOE is adopting new energy conservation standards for 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 by adopting the efficiency levels specified by ASHRAE Standard 90.1–2007. DOE did not analyze the economic and energy savings potential of amended national energy conservation standards for 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 for the efficiency levels in ASHRAE Standard 90.1–2007 or efficiency levels beyond those specified in ASHRAE Standard 90.1, because there is no equipment currently being manufactured in this equipment class.[23] 74 FR 12013. Table VI.28 shows the amended energy conservation standards for this equipment. The standards for 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 established in this final rule will apply starting on January 10, 2011.

Table VI.28. Amended Energy Conservation Standards for 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

ASHRAE Equipment Class	Federal Energy Conservation Standards	Amended Federal Energy Conservation Standards	
		Energy-Efficiency Levels	Effective Date
Commercial Package Air-Conditioning and Heating Equipment			
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**	1/10/2011
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	1/10/2011

VII. Procedural Issues and Regulatory Review

A. Review Under Executive Order 12866

Today's final rule has been determined not to be a ''significant regulatory action'' under section 3(f)(1) of Executive Order 12866, ''Regulatory Planning and Review.'' 58 FR 51735 (Oct. 4, 1993). Accordingly, this action was not subject to review under that Executive Order by the Office of Information and Regulatory Affairs (OIRA) of the Office of Management and Budget.

B. Review Under the National Environmental Policy Act

DOE prepared an environmental assessment (EA) of the impacts of the proposed standards in the March 2009 NOPR pursuant to the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*), the regulations of the Council on Environmental Quality (40 CFR parts 1500–1508), and DOE's regulations for compliance with the National Environmental Policy Act (10 CFR part 1021). 74 FR 26596. This assessment included a concise examination of the impacts of emission reductions likely to result from the rule. DOE found the environmental effects associated with today's various standard levels for commercial packaged boilers and 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 to be not significant, and therefore it is issuing a Finding of No Significant Impact (FONSI) pursuant to the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*), the regulations of the Council on Environmental Quality (40 CFR parts 1500–1508), and DOE's regulations for compliance with the National Environmental Policy Act (10 CFR part

[23] ASHRAE Standard 90.1–2007 specified efficiency levels for 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 even though equipment does not exist in the current marketplace in this category. ASHRAE's actions for this equipment triggered DOE action regardless of whether equipment is currently offered for sale.

1021). The FONSI is available in the docket for this rulemaking.

C. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires preparation of an initial regulatory flexibility analysis for any rule that by law must be proposed for public comment, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. As required by Executive Order 13272, ''Proper Consideration of Small Entities in Agency Rulemaking,'' 67 FR 53461 (August 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the potential impacts of its rules on small entities are properly considered during the DOE rulemaking process. 68 FR 7990. DOE has made its procedures and policies available on the Office of the General Counsel's Web site: *http://www.gc.doe.gov.*

DOE reviewed the March 2009 NOPR under the provisions of the Regulatory Flexibility Act and the policies and procedures published on February 19, 2003 (68 FR 7990). 74 FR 12044. As part of this rulemaking, DOE examined the existing compliance costs manufacturers already bear and compared them to the revised compliance costs, based on the proposed revisions to the test procedure. Since DOE is adopting the efficiency levels in ASHRAE Standard 90.1–2007, which are part of the prevailing industry standard and the result of a consensus agreement, DOE believes that commercial packaged boiler manufacturers are already producing equipment at these efficiency levels. For 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, DOE believes the efficiency levels being adopted are also part of the prevailing industry standard and that manufacturers would experience no impacts, because no such equipment is currently manufactured. Furthermore, DOE believes the industry standard was developed through a process, which would attempt to mitigate the impacts on manufacturers, including any small commercial packaged boiler manufacturers, while increasing the efficiency of this equipment. In addition, DOE does not find that the costs imposed by the revisions proposed to the test procedure for commercial packaged boilers in this document would result in any significant increase in testing or compliance costs.

DOE received no comments in response to the NOPR. For the reasons stated above, DOE certifies that the final rule would not have a significant economic impact on a substantial number of small entities. Therefore, DOE did not prepare an initial regulatory flexibility analysis for the proposed rule.

D. Review Under the Paperwork Reduction Act

Under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*) (PRA), a person is not required to respond to a collection of information by a Federal agency, including a requirement to maintain records, unless the collection displays a valid OMB control number. (44 U.S.C. 3506(c)(1)(B)(iii)(V)) DOE stated in the March 2009 NOPR that this rulemaking would impose no new information and recordkeeping requirements, and that OMB clearance is not required under the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*). 74 FR 12044. DOE received no comments on this in response to the NOPR and, as with the proposed rule, today's final rule imposes no information and recordkeeping requirements. DOE takes no further action in this rulemaking with respect to the Paperwork Reduction Act.

E. Review Under the Unfunded Mandates Reform Act of 1995

As described in the March 2009 NOPR, DOE reviewed this regulatory action under Title II of the Unfunded Mandates Reform Act of 1995 (UMRA) (Pub. L. 104–4), which requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. For proposed regulatory actions likely to result in a rule that may cause expenditures by State, local, and Tribal governments, in the aggregate, or by the private sector of $100 million or more in any one year (adjusted annually for inflation), section 202 of UMRA requires a Federal agency to publish a written statement assessing the resulting costs, benefits, and other effects of the rule on the national economy (2 U.S.C. 1532(a) and (b)). Section 204 of UMRA requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and Tribal governments on a proposed ''significant intergovernmental mandate.'' (2 U.S.C. 1534) Section 203 of UMRA requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments that may be affected before establishing any requirements that might significantly or uniquely affect small governments. (2 U.S.C. 1533) On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under UMRA (62 FR 12820) (also available at: *http://www.gc.doe.gov*).

DOE concluded that the March 2009 NOPR contained neither an intergovernmental mandate nor a mandate that may result in the expenditure by State, local, and Tribal governments in the aggregate, or by the private sector, of $100 million or more in any year. 74 FR 12045. Accordingly, no assessment or analysis was required under UMRA. *Id.* DOE received no comments concerning the UMRA in response to the NOPR, and its conclusions on this issue are the same for the final rule as for the March 2009 NOPR. DOE takes no further action in today's final rule with respect to the UMRA.

F. Review Under the Treasury and General Government Appropriations Act, 1999

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Pub. L. 105–277) requires Federal agencies to issue a Family Policymaking Assessment for any proposed rule that may affect family well-being. As stated in the March 2009 NOPR, DOE decided this rule would not have any impact on the autonomy or integrity of the family as an institution. 74 FR 12045. Accordingly, DOE concluded that it was unnecessary to prepare a Family Policymaking Assessment. *Id.* DOE received no comments concerning Section 654 in response to the NOPR, and thus takes no further action in today's final rule with respect to this provision.

G. Review Under Executive Order 13132

Executive Order 13132, ''Federalism,'' 64 FR 43255 (August 4, 1999) imposes certain requirements on agencies formulating and implementing policies or regulations that preempt State law or that have Federalism implications. Agencies are required to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and to carefully assess the necessity for such actions. The Executive Order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have Federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. 65 FR 13735. As explained in the March 2009 NOPR, DOE examined this proposed rule and determined that it would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. 74 FR 12045. EPCA governs and prescribes Federal preemption of State regulations as to energy conservation for the equipment that are the subject of today's final rule. States can petition DOE for exemption from such preemption to the extent, and based on criteria, as set forth in EPCA. (42 U.S.C. 6297(d) and 6316(b)(2)(D)) No further action is required by Executive Order 13132.

H. Review Under Executive Order 12988

With respect to the review of existing regulations and the promulgation of new regulations, section 3(a) of Executive Order 12988, ''Civil Justice Reform'' (61 FR 4729 (Feb. 7, 1996)) imposes on Federal agencies the general duty to adhere to the following requirements: (1) Eliminate drafting errors and ambiguity; (2) write regulations to minimize litigation; (3) provide a clear legal standard for affected conduct rather than a general standard and promote simplification and burden reduction. With regard to the review required by section 3(a), section 3(b) of Executive Order 12988 specifically requires that Executive agencies make every reasonable effort to ensure that the regulation (1) clearly specifies the preemptive effect, if any; (2) clearly specifies any effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction; (4) specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires Executive agencies to review regulations in light of applicable standards in sections 3(a) and 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, the final rule meets the relevant standards of Executive Order 12988.

I. Review Under the Treasury and General Government Appropriations Act, 2001

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516 note) provides for agencies to review most disseminations of information to the public under guidelines established by each agency pursuant to general guidelines issued by OMB. OMB's guidelines were published at 67 FR 8452 (Feb. 22, 2002), and DOE's guidelines were published at 67 FR 62446 (Oct. 7, 2002). DOE has reviewed this notice under the OMB and DOE guidelines and has concluded that it is consistent with applicable policies in those guidelines.

J. Review Under Executive Order 13211

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

DOE determined the proposed rule would not have a significant adverse effect on the supply, distribution, or use of energy, and, therefore, is not a significant energy action. 74 FR 12045. Furthermore, this regulatory action has not been designated as a significant energy action by the Administrator or of OIRA. Accordingly, DOE has not prepared a Statement of Energy Effects. *Id.* DOE received no comments on this issue in response to the March 2009 NOPR. As with the proposed rule, DOE has concluded that today's final rule is not a significant energy action within the meaning of Executive Order 13211, and has not prepared a Statement of Energy Effects on the rule.

K. Review Under Executive Order 12630

Pursuant to Executive Order 12630, ''Governmental Actions and Interference with Constitutionally Protected Property Rights,'' 53 FR 8859 (March 15, 1988), DOE has determined that this rule would not result in any takings that might require compensation under the Fifth Amendment to the United States Constitution.

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

Under section 301 of the Department of Energy Organization Act (Pub. L. 95–91), the Department of Energy must comply with section 32 of the Federal Energy Administration Act of 1974 (Pub. L. 93–275), as amended by the Federal Energy Administration Authorization Act of 1977 (Pub. L. 95–70). (15 U.S.C. 788) Section 32 provides that where a proposed rule authorizes or requires use of commercial standards, the notice of proposed rulemaking must inform the public of the use and background of such standards. In addition, section 32(c) requires DOE to consult with the Department of Justice and the Federal Trade Commission (FTC) concerning the impact of the commercial or industry standards on competition.

Certain amendments and revisions in this final rule incorporate updates to commercial standards already codified in DOE's test procedure regulations in the CFR. As stated in the March 2009 NOPR, DOE has evaluated these updated standards and is unable to conclude whether they fully comply with the requirements of section 32(b) of the Federal Energy Administration Act, (*i.e.,* determine that they were developed in a manner that fully provides for public participation, comment, and review). 74 FR 12046. DOE has consulted with the Attorney General and the Chairman of the FTC concerning the impact of these standards on competition, and neither recommended against their incorporation.

M. Review Under the Information Quality Bulletin for Peer Review

On December 16, 2004, OMB in consultation with the Office of Science and Technology Policy (OSTP), issued its ''Final Information Quality Bulletin for Peer Review'' (Bulletin). 70 FR 2664 (Jan. 14, 2005). The Bulletin establishes that certain scientific information shall be peer reviewed by qualified specialists before it is disseminated by the Federal government, including influential scientific information related to agency regulatory actions. The purpose of the bulletin is to enhance the quality and credibility of the Government's scientific information. Under the Bulletin, the energy conservation standards rulemakings analyses are ''influential scientific information.'' The Bulletin defines ''influential scientific information'' as ''scientific information the agency reasonably can determine will have or does have a clear and substantial impact on important public policies or private sector decisions.'' 70 FR 2664, 2667 (Jan. 14, 2005).

In response to OMB's Bulletin, DOE conducted formal peer reviews of the energy conservation standards development process and analyses, and then prepared a Peer Review Report pertaining to the energy conservation standards rulemaking analyses. Generation of this report involved a rigorous, formal, and documented evaluation process using objective criteria and qualified and independent reviewers to make a judgment as to the technical/scientific/business merit, the actual or anticipated results, and the productivity and management effectiveness of programs and/or projects. The ''Energy Conservation Standards Rulemaking Peer Review Report,'' dated February 2007, has been disseminated and is available at *http://www.eere.energy.gov/buildings/appliance_standards/peer_review.html.*

N. Congressional Notification

As required by 5 U.S.C. 801, DOE will submit to Congress a report regarding the issuance of today's final rule prior to the effective date set forth at the outset of this notice. The report will state that it has been determined that the rule is a ''major rule'' as defined by 5 U.S.C. 804(2). DOE also will submit the supporting analyses to the Comptroller General in the U.S. Government Accountability Office (GAO) and make them available to Congress.

VIII. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this final rule.

List of Subjects in 10 CFR Part 431

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

Issued in Washington, DC, on July 8, 2009.

Cathy Zoi,

Assistant Secretary, Energy Efficiency and Renewable Energy.

■ For the reasons set forth in the preamble, DOE is amending Chapter II of Title 10, Code of Federal Regulations, Part 431 to read as set forth below:

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

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

Authority: 42 U.S.C. 6291–6317.

■ 2. In § 431.82, revise the definition ''combustion efficiency'' and add definitions for ''Btu/h or Btu/hr'' and ''thermal efficiency,'' in alphabetical order to read as follows:

§ 431.82 Definitions concerning commercial packaged boilers.

* * * * *

Btu/h or *Btu/hr* means British thermal units per hour.

Combustion efficiency for a commercial packaged boiler is determined using test procedures prescribed under § 431.86 and is equal to 100 percent minus percent flue loss (percent flue loss is based on input fuel energy).

* * * * *

Thermal efficiency for a commercial packaged boiler is determined using test procedures prescribed under § 431.86 and is the ratio of the heat absorbed by the water or the water and steam to the higher heating value in the fuel burned.

■ 3. Revise § 431.85 to read as follows:

§ 431.85 Materials incorporated by reference.

(a) *General.* We incorporate by reference the following standards into Subpart E of Part 431. The material listed has been approved for incorporation by reference by the Director of the **Federal Register** in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Any subsequent amendment to a standard by the standard-setting organization will not affect the DOE regulations unless and until amended by DOE. Material is incorporated as it exists on the date of the approval and a notice of any change in the material will be published in the **Federal Register**. All approved material is available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030 or go to *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.* Also, this material is available for inspection at U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, 6th Floor, 950 L'Enfant Plaza, SW., Washington, DC 20024, 202–586–2945, or go to: *http://www1.eere.energy.gov/buildings/appliance_standards/.* Standards can be obtained from the sources listed below.

(b) *HI.* The Gas Appliance Manufacturers Association (GAMA) merged in 2008 with the Air-Conditioning and Refrigeration Institute to become the Air-Conditioning, Heating, and Refrigeration Institute (AHRI). The Hydronics Institute BTS–2000 Testing Standard can be obtained from AHRI. For information on how to obtain this material, contact the Hydronics Institute Section of AHRI, P.O. Box 218, Berkeley Heights, NJ 07922–0218, (866) 408–3831, or go to: *http://www.ahrinet.org/Content/OrderaStandard_573.aspx.*

(1) The Hydronics Institute Division of GAMA BTS–2000 Testing Standard, (''HI BTS–2000, Rev 06.07''), *Method to Determine Efficiency of Commercial Space Heating Boilers,* Second Edition (Rev 06.07), 2007, IBR approved for § 431.86.

(2) [Reserved].

■ 4. Revise § 431.86, to read as follows:

§ 431.86 Uniform test method for the measurement of energy efficiency of commercial packaged boilers.

(a) *Scope.* This section provides test procedures that must be followed for measuring, pursuant to EPCA, the steady state combustion efficiency and thermal efficiency of a gas-fired or oil-fired commercial packaged boiler. These test procedures apply to packaged low pressure boilers that have rated input capacities of 300,000 Btu/h or more and are ''commercial packaged boilers,'' but do not apply under EPCA to ''packaged high pressure boilers.''

(b) *Definitions.* For purposes of this section, the Department incorporates by reference the definitions specified in Section 3.0 of the HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85), with the exception of the definition for the terms ''packaged boiler,'' ''condensing boilers,'' and ''packaged low pressure steam'' and ''hot water boiler.''

(c) *Test Method for Commercial Packaged Boilers—General.* Follow the provisions in this paragraph (c) for all testing of packaged low pressure boilers that are commercial packaged boilers.

(1) *Test Setup*—(i) *Classifications:* If employing boiler classification, you must classify boilers as given in Section 4.0 of the HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85).

(ii) *Requirements:* (A) Before March 2, 2012, conduct the combustion efficiency test as given in Section 5.2 (Combustion Efficiency Test) of the HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85) for all commercial packaged boiler equipment classes.

(B) On or after March 2, 2012, conduct the thermal efficiency test as given in Section 5.1 (Thermal Efficiency Test) of the HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85) for the following commercial packaged boiler equipment classes: Small, gas, hot water; small, gas, steam, all except natural draft; small, gas, steam, natural draft; small, oil, hot water; small, oil, steam; large, gas, steam, all except natural draft; large, gas, steam, natural draft; and large, oil, steam. On or after March 2, 2012, conduct the combustion efficiency test as given in Section 5.2 (Combustion Efficiency Test) of the HI BTS–2000, Rev 06.07 for the following commercial packaged boiler equipment classes: Large, gas-fired, hot water and large, oil-fired, hot water.

(iii) *Instruments and Apparatus:* (A) Follow the requirements for instruments and apparatus in sections 6 (Instruments) and 7 (Apparatus), of the HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85), with the exception of section 7.2.5 (flue connection for outdoor boilers) which is replaced with paragraph (c)(1)(iii)(B) of this section:

(B) *Flue Connection for Outdoor Boilers:* Consistent with the procedure specified in section 7.2.1 of HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85), the integral venting used in oil-fired and power gas outdoor boilers may be modified only to the extent necessary to permit the boiler's connection to the test flue apparatus for testing.

(iv) *Test Conditions:* Use test conditions from Section 8.0 (excluding 8.6.2) of HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85) for combustion efficiency testing. Use all of the test conditions from Section 8.0 of HI BTS–2000, Rev 06.07 for thermal efficiency testing.

(2) *Test Measurements*—(i) *Non-Condensing Boilers:* (A) *Combustion Efficiency.* Measure for combustion efficiency according to sections 9.1 (excluding sections 9.1.1.2.3 and 9.1.2.2.3), 9.2 and 10.2 of the HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85).

(B) *Thermal Efficiency.* Measure for thermal efficiency according to sections 9.1 and 10.1 of the HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85).

(ii) *Procedure for the Measurement of Condensate for a Condensing Boiler.* For the combustion efficiency test, collect flue condensate as specified in Section 9.2.2 of HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85). Measure the condensate from the flue gas under steady state operation for the 30 minute collection period during the 30 minute steady state combustion efficiency test. Flue condensate mass shall be measured immediately at the end of the 30 minute collection period to prevent evaporation loss from the sample. The humidity of the room shall at no time exceed 80 percent. Determine the mass of flue condensate for the steady state period by subtracting the tare container weight from the total container and flue condensate weight measured at the end of the test period. For the thermal efficiency test, collect and measure the condensate from the flue gas as specified in Section 9.1.1 and 9.1.2 of HI BTS–2000, Rev 06.07.

(iii) *A Boiler That is Capable of Supplying Either Steam or Hot Water*—(A) *Testing.* For purposes of EPCA, before March 2, 2012, measure the combustion efficiency of any size commercial packaged boiler capable of supplying either steam or hot water either by testing the boiler in the steam mode or by testing it in both the steam and hot water modes. On or after March 2, 2012, measure the combustion efficiency and thermal efficiency of a large (fuel input greater than 2,500 kBtu/h) commercial packaged boiler capable of supplying either steam or hot water either by testing the boiler for both efficiencies in steam mode, or by testing the boiler in both steam and hot water modes measuring the thermal efficiency of the boiler in steam mode and the combustion efficiency of the boiler in hot water mode. Measure only the thermal efficiency of a small (fuel input of greater than or equal to 300 kBtu/h and less than or equal to 2,500 kBtu/h) commercial packaged boiler capable of supplying either steam or hot water either by testing the boiler for thermal efficiency only in steam mode or by testing the boiler for thermal efficiency in both steam and hot water modes.

(B) *Rating.* If testing a large boiler only in the steam mode, use the efficiencies determined from such testing to rate the thermal efficiency for the steam mode and the combustion efficiency for the hot water mode. If testing a large boiler in both modes, rate the boiler's efficiency for each mode based on the testing in that mode. If testing a small boiler only in the steam mode, use the efficiencies determined from such testing to rate the thermal efficiency for the steam mode and the hot water mode. If testing a small boiler in both modes, rate the boiler's efficiency for each mode based on the testing in that mode.

(3) *Calculation of Efficiency*—(i) *Combustion Efficiency.* Use the calculation procedure for the combustion efficiency test specified in Section 11.2 (including the specified subsections of 11.1) of the HI BTS–2000, Rev 06.07 (incorporated by reference, *see* § 431.85).

(ii) *Thermal Efficiency.* Use the calculation procedure for the thermal efficiency test specified in Section 11.1 of the HI BTS–2000, Rev 06.07 (incorporated by reference, *see* § 431.85).

■ 5. Revise § 431.87 to read as follows:

§ 431.87 Energy conservation standards and their effective dates.

(a) Each commercial packaged boiler manufactured on or after January 1, 1994, and before March 2, 2012, must meet the following energy efficiency standard levels:

(1) For a gas-fired packaged boiler with a capacity (rated maximum input) of 300,000 Btu/h or more, the combustion efficiency at the maximum rated capacity must be not less than 80 percent.

(2) For an oil-fired packaged boiler with a capacity (rated maximum input) of 300,000 Btu/h or more, the combustion efficiency at the maximum rated capacity must be not less than 83 percent.

(b) Each commercial packaged boiler listed in Table 1 to § 431.87 and manufactured on or after the effective date listed in Table 1 of this section, must meet the applicable energy conservation standard in Table 1.

TABLE 1 TO § 431.87—COMMERCIAL PACKAGED BOILER ENERGY CONSERVATION STANDARDS

Equipment type	Subcategory	Size category (input)	Efficiency level—Effective date: March 2, 2012 *
Hot Water Commercial Packaged Boilers.	Gas-fired	≥300,000 Btu/h and ≤2,500,000 Btu/h	80.0% E_T
Hot Water Commercial Packaged Boilers.	Gas-fired	>2,500,000 Btu/h	82.0% E_C
Hot Water Commercial Packaged Boilers.	Oil-fired	≥300,000 Btu/h and ≤2,500,000 Btu/h	82.0% E_T
Hot Water Commercial Packaged Boilers.	Oil-fired	>2,500,000 Btu/h	84.0% E_C
Steam Commercial Packaged Boilers	Gas-fired—all, except natural draft	≥300,000 Btu/h and ≤2,500,000 Btu/h	79.0% E_T
Steam Commercial Packaged Boilers	Gas-fired—all, except natural draft	>2,500,000 Btu/h	79.0% E_T
Steam Commercial Packaged Boilers	Gas-fired—natural draft	≥300,000 Btu/h and ≤2,500,000 Btu/h	77.0% E_T
Steam Commercial Packaged Boilers	Gas-fired—natural draft	>2,500,000 Btu/h	77.0% E_T
Steam Commercial Packaged Boilers	Oil-fired	≥300,000 Btu/h and ≤2,500,000 Btu/h	81.0% E_T
Steam Commercial Packaged Boilers	Oil-fired	>2,500,000 Btu/h	81.0% E_T

* Where E_C is combustion efficiency and E_T is thermal efficiency as defined in § 431.82.

(c) Each commercial packaged boiler listed in Table 2 to § 431.87 and manufactured on or after the effective date listed in Table 2 of this section, must meet the applicable energy conservation standard in Table 2.

TABLE 2 TO § 431.87—COMMERCIAL PACKAGED BOILER ENERGY CONSERVATION STANDARDS

Equipment type	Subcategory	Size category (input)	Efficiency level—Effective date: March 2, 2022 *
Steam Commercial Packaged Boilers	Gas-fired—natural draft	≥300,000 Btu/h and ≤2,500,000 Btu/h	79.0% E_T
Steam Commercial Packaged Boilers	Gas-fired—natural draft	>2,500,000 Btu/h	79.0% E_T

* Where E_C is combustion efficiency and E_T is thermal efficiency as defined in § 431.82.

■ 6. Add a new paragraph (d) to § 431.97 to read as follows:

§ 431.97 Energy efficiency standards and their effective dates.

* * * * *

(d) Each water-cooled and evaporatively-cooled commercial package air conditioning and heating equipment with a cooling capacity at or above 240,000 Btu/h and less than 760,000 Btu/h manufactured on or after January 10, 2011, shall meet the following standard levels:

(1) For equipment that utilizes electric resistance heat or without heating, the energy efficiency ratio must be not less than 11.0.

(2) For equipment that utilizes all other types of heating, the energy efficiency ratio must be not less than 10.8.

Note: The following appendix will not appear in the Code of Federal Regulations.

Department of Justice, Antitrust Division, Christine A. Varney, Assistant Attorney General, Main Justice Building, 950 Pennsylvania Avenue, NW., Washington, DC 20530–0001, (202) 514–2401/(202) 616–2645(f), *antitrust.atr@usdoj.gov*, *http://www.usdoj.gov/atr.*

May 8, 2009.

Eric J. Fygi, Acting General Counsel, Department of Energy, Washington, DC 20585.

Dear Acting General Counsel Fygi: I am responding to your March 30, 2009 letter seeking the views of the Attorney General about the potential impact on competition of proposed amended energy conservation standards for commercial packaged boilers and certain commercial packaged air-conditions and heat pumps. Your request was submitted pursuant to Section 325(0)(2)(B)(i)(V) of the Energy Policy and Conservation Act, as amended, 42 U.S.C. 6295(0)(2)(B)(i)(V), which requires the Attorney General to make a determination of the impact of any lessening of competition that is likely to result from the imposition of proposed energy conservation standards. The Attorney General's responsibility for responding to requests from other departments about the effect of a program on competition has been delegated to the Assistant Attorney General for the Antitrust Division in 28 CFR 0.40(g).

In conducting its analysis, the Antitrust Division examines whether a proposed standard may lessen competition, for example, by substantially limiting consumer choice leaving consumers with fewer competitive alternatives, placing certain manufacturers of a product at an unjustified competitive disadvantage compared to other manufacturers; or by inducing avoidable inefficiencies in production or distribution of particular products.

We have reviewed the proposed standards and the supplementary information submitted to the Attorney General, and attended the April 7, 2009 public hearing on the proposed standards.

We have concluded that the proposed standards are not likely to have an adverse effect on competition. In reaching this conclusion, we note the absence of any competitive concerns raised by industry participants at the hearing. Indeed, the efficiency levels in the proposed standards are based on a consensus recommendation submitted by efficiency advocacy groups and the trade association for manufacturers of commercial packaged boilers. Based on these facts, we believe the new standard would not likely reduce competition.

Sincerely,

Christine A. Varney,
Assistant Attorney General.

[FR Doc. E9–16774 Filed 7–21–09; 8:45 am]

BILLING CODE 6450–01–P