

DEPARTMENT OF ENERGY

Office of Energy Efficiency and Renewable Energy

10 CFR Part 431

[Docket No. EE-RM/STD-00-100]

RIN 1904-AB06

Energy Efficiency Program for Commercial and Industrial Equipment: Efficiency Standards 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 Energy Policy and Conservation Act (EPCA), as amended, establishes energy efficiency standards for certain commercial heating, air conditioning and water heating products. For some of these products, the Department of Energy (DOE, Department or we) is adopting efficiency standards contained in the new American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) and Illuminating Engineering Society of North America (IESNA) Standard 90.1, as revised in October 1999, as uniform national standards. This final rule also identifies other products covered by the recently revised ASHRAE/IESNA Standard 90.1-1999 that DOE will analyze further to determine whether more stringent standards are warranted.

DATES: *Effective date:* This rule is effective February 12, 2001.

Compliance Dates: The compliance date of standards adopted in this rule for central water-cooled air conditioners, water source heat pumps, and evaporatively-cooled air conditioning products with cooling capacities rated at or above 135,000 Btu/h and below 240,000 Btu/h is October 29, 2004. For all other standards adopted in this rule, the compliance date is October 29, 2003.

ADDRESSES: You can read the transcript of the public workshop regarding this rulemaking, the public comments received, and the Screening Analysis report referred to in this notice in the Freedom of Information Reading Room (Room No. 1E-190) at the U.S. Department of Energy, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585, between the hours of 9:00 a.m. and 4:00 p.m., Monday through Friday, except Federal holidays. You can also obtain the Screening Analysis report electronically

from the Office of Building Research and Standards world wide web site at the following URL address: [http://www.eren.doe.gov/buildings/codes_standards/index.htm].

This final rule also refers to certain industry standards established by ASHRAE and IESNA. These industry standards are referenced by the single comprehensive title "ASHRAE/IESNA Standard 90.1." The revision of ASHRAE/IESNA Standard 90.1 published in 1999 is referenced by the title "ASHRAE/IESNA Standard 90.1-1999." You can view this standard at the Department's Information Reading Room at the address stated above. You can also obtain copies by mail from the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., 1971 Tullie Circle, NE, Atlanta, GA 30329, or electronically from ASHRAE's web site, [<http://www.ashrae.org/book/bookshop.htm>].

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I. Introduction*A. Consumer Overview*

This rule adopts amended ASHRAE/IESNA Standard 90.1-1999 energy efficiency standards for 18 product categories of commercial air conditioners, heat pumps, furnaces, water heaters, and hot water storage tanks. The effect is to replace standards specified in EPCA for these product categories for equipment manufactured after October 29, 2003, or October 29, 2004, in the case of large packaged air conditioners and heat pumps. DOE expects the imposition of these new standards to save in excess of 1.1 quadrillion Btu (Quads) of energy nationwide between 2004 and 2030.

The commercial air conditioners, heat pumps, furnaces, water heaters and hot water storage tanks subject to the standards adopted today apply to equipment generally found in commercial buildings. Today's standards do not apply to consumer products. EPCA established the efficiency standards for consumer appliances, and the Department is considering amendments for residential central air conditioners and heat pumps, clothes washers and water heaters under separate proceedings. The new commercial standards apply to products manufactured after the dates specified, to products installed in new construction as well as existing buildings.

DOE expects the energy costs for space heating and cooling and water heating in commercial buildings to be reduced as a result of today's standards. In addition to reducing building cost-of-operation, the standards will result in lower emissions due to less fuel being used for heating and for generating electricity.

In addition, the Department is considering more stringent standards than those adopted by ASHRAE for 11 categories of commercial products. The Department believes more stringent standards than those found in ASHRAE/IESNA Standard 90.1-1999 may save

significant additional amounts of energy and be technologically feasible and economically justified. DOE also plans to recommend to ASHRAE that it consider new, amended standards for four categories of commercial central air

conditioners and heat pumps not considered in the update of ASHRAE/IESNA Standard 90.1-1999. Finally, the Department is rejecting a standard for electric water heaters that will increase energy use over the level specified in

EPCA and leaving the EPCA level in place. A summary of the actions taken by the Department is presented in Table 1.

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Table 1. Summary of DOE Actions

Action	Product Category
Adopt the ASHRAE/IESNA Standard 90.1-1999 efficiency level.	Central Water Source HP <17 kBtu/h Central Water Source HP 17 - 65 kBtu/h Central Water Source HP 65 - 135 kBtu/h Central Water Source HP 135 - 240 kBtu/h Central Water Cooled AC <65 kBtu/h Central Water Cooled AC 65 - 135 kBtu/h Central Water Cooled AC 135 - 240 kBtu/h Evaporatively Cooled AC Products Gas-Fired Warm Air Furnaces \geq 225 kBtu/h Oil-Fired Warm Air Furnaces, \geq 225 kBtu/h Gas Storage Water Heaters \leq 155 kBtu/h Oil-Fired Storage Water Heaters \leq 155 kBtu/h Gas Storage Water Heaters >155 kBtu/h Oil-Fired Storage Water Heaters >155 kBtu/h Gas-Fired Instantaneous Water Heaters with Tanks Oil-Fired Instantaneous Water Heaters with Tanks Tankless Oil-Fired Instantaneous Water Heaters Unfired Hot Water Storage Tanks
Propose consideration of an addendum to ASHRAE/IESNA Standard 90.1-1999.	3-Phase Single Package Air Source AC <65 kBtu/h 3-Phase Split Air Source AC <65 kBtu/h 3-Phase Single Package Air Source HP <65 kBtu/h 3-Phase Split Air Source HP <65 kBtu/h
Propose consideration of an addendum to ASHRAE/IESNA Standard 90.1-1999 and evaluate whether a higher standard is justified.	Central Air Source AC 65 - 135 kBtu/h Central Air Source HP 65 - 135 kBtu/h Central Air Source AC 135 - 240 kBtu/h Central Air Source HP 135 - 240 kBtu/h Packaged Terminal Air Conditioners Packaged Terminal Heat Pumps Large Gas-Fired Boilers >2.5 MMBtu/h Large Oil-Fired Boilers >2.5 MMBtu/h Small Gas-Fired Boilers 0.3 - 2.5 MMBtu/h Small Oil-Fired Boilers 0.3 - 2.5 MMBtu/h Tankless Gas-Fired Instantaneous Water Heaters
Reject the ASHRAE/IESNA Standard 90.1-1999 efficiency level.	Electric Water Heaters

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December 26, 2000

B. Authority

Part B of Title III of the Energy Policy and Conservation Act (EPCA) of 1975, Pub. L. 94-163, as amended, by the National Energy Conservation Policy Act of 1978 (NECPA), Pub. L. 95-619, the National Appliance Energy Conservation Act of 1987 (NAECA), Pub. L. 100-12, the National Appliance Energy Conservation Amendments of 1988 (NAECA 1988), Pub. L. 100-357, and the Energy Policy Act of 1992 (EPACT), Pub. L. 102-486, established the Energy Conservation Program for Consumer Products other than Automobiles. Part 3 of Title IV of NECPA amended EPCA to add "Energy Efficiency of Industrial Equipment," which included air conditioners, furnaces, and other types of equipment.

EPACT also amended EPCA with respect to industrial equipment, providing definitions, test procedures, labeling provisions, energy conservation standards, and the authority to require information and reports from manufacturers. EPCA sections 340-345, 42 U.S.C. 6311-6316. For example, EPCA specifies explicit minimum energy efficiency levels for certain commercial packaged air conditioning and heating products, packaged terminal air conditioners and heat pumps, warm air furnaces, packaged boilers, water heaters and unfired hot water storage tanks. EPCA section 342(a)(1)-(5), 42 U.S.C. 6313(a)(1)-(5). The efficiency requirements in the statute correspond to the levels in ASHRAE/IESNA Standard 90.1 as in effect on October 24, 1992. The statute further provides that if the efficiency levels in ASHRAE/IESNA Standard 90.1 are amended after that date for any of the covered products, the Secretary of Energy (Secretary) must establish an amended uniform national standard at the new minimum level for each effective date specified in ASHRAE/IESNA Standard 90.1, unless (s)he determines, through a rulemaking supported by clear and convincing evidence, that a more stringent standard is technologically feasible and economically justified and would result in significant additional energy conservation. EPCA section 342(a)(6)(A), 42 U.S.C. 6313(a)(6)(A).

If the Secretary elects to publish such a rule, it must contain the amended standard, and the determination must consider, to the greatest extent practicable: the economic impact on the manufacturers and consumers of the affected products; savings in operating cost throughout the life of the product, compared to any increases in initial cost or maintenance expense; the total projected amount of energy savings likely to result directly from the imposition of the standard; any lessening of the utility or performance of the affected products; the impact of any lessening of competition; the need for national energy conservation; and other factors the Secretary considers relevant. The Secretary may not prescribe such an amended standard if (s)he finds (and publishes the finding) that interested persons have established by a preponderance of evidence that the amended standard is likely to result in unavailability in the United States of products with performance characteristics (including reliability), features, sizes, capacities and volumes that are substantially the same as those generally available in the United States at the time of the Secretary's finding. EPCA section 342(a)(6)(B), 42 U.S.C. 6313(a)(6)(B).

Finally, the Secretary may not prescribe any amended standard which increases maximum allowable energy use or decreases minimum required energy efficiency. EPCA section 342(a)(6)(B)(ii), 42 U.S.C. 6313(a)(6)(B)(ii).

C. Background

1. General

Pursuant to the EPACT amendments to EPCA in 1992, DOE extended its energy conservation program for consumer products to certain commercial and industrial equipment, and created a new Part 431 in Title 10 of the Code of Federal Regulations, entitled, "Energy Conservation Program for Commercial and Industrial Equipment." This part includes commercial heating, air conditioning and water heating products, as well as large electric motors. The new program consists of: test procedures, Federal energy conservation standards, labeling,

certification and enforcement procedures.

2. ASHRAE Action

ASHRAE's Board of Directors gave final approval to certain revisions to ASHRAE/IESNA Standard 90.1 on October 29, 1999. The revised Standard indicates that the amended commercial HVAC and water heater equipment efficiencies will become effective as part of the Standard two years after final ASHRAE approval (i.e., on October 29, 2001).

ASHRAE changed the efficiency standards only for some products covered by the ASHRAE/IESNA Standard 90.1. For the remaining products, ASHRAE considered some efficiency levels in the course of revising Standard 90.1 but left them at their preexisting values, and it deferred consideration of other products. The standard levels prescribed in EPCA and ASHRAE/IESNA Standard 90.1-1999 appear in Tables 2 and 3.

II. Discussion

A. The Screening Analysis and Results

1. Content and Results of the Screening Analysis

To decide whether to adopt efficiency standards contained in ASHRAE/IESNA Standard 90.1-1999 or to initiate the process of developing and analyzing more stringent standards for particular product categories, DOE performed a simplified Screening Analysis and evaluated other information. This process was designed to identify products covered by EPCA for which it was unlikely that a more detailed analysis would reveal evidence sufficient to justify more stringent requirements, and also to identify products for which it was reasonably possible such evidence would be revealed by further analysis. Screening products in this way allows DOE to adopt several ASHRAE/IESNA Standard 90.1-1999 standards expeditiously without hindering appropriate consideration of the remaining products.

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Table 2. Standard Levels for Air Conditioners and Heat Pumps

Product Category	Product Subcategory	Efficiency Level ^a	
		EPCA	ASHRAE 90.1-1999
Small Commercial Packaged Air Conditioning and Heating Equipment	<65 kBtu/h, Air-Cooled, 3 Phase, Central Split System AC, HP	SEER: 10.0, HSPF: 6.8	SEER: 10.0, HSPF: 6.8
	<65 kBtu/h, Air-Cooled, 3 Phase, Central Single Package AC, HP	SEER: 9.7, HSPF: 6.6	SEER: 9.7, HSPF: 6.6
	≥ 65 kBtu/h and <135 kBtu/h, Air-Cooled, Central AC, HP	EER ^b : 8.9, COP ^c : 3	EER ^b : 10.3, COP ^c : 3.2
	<65 kBtu/h, Evaporatively-Cooled, Central AC	EER ^b : 9.3	EER ^b : 12.1
	<65 kBtu/h, Water-Cooled, Central AC	EER ^d : 9.3	EER ^d : 12.1
	<17 kBtu/h, Water-Source, Central HP	EER ^d : 9.3	EER ^e : 11.2
	≥ 17 kBtu/h and <65 kBtu/h, Water-Source, Central HP	EER ^d : 9.3	EER ^e : 12.0
	≥ 65 kBtu/h and <135 kBtu/h, Evaporatively-Cooled, Central AC	EER ^b : 10.5	EER ^b : 11.5
	≥ 65 kBtu/h and <135 kBtu/h, Water-Cooled, Central AC	EER ^d : 10.5	EER ^d : 11.5
	≥ 65 kBtu/h and <135 kBtu/h, Water-Source, Central HP	EER ^d : 10.5	EER ^e : 12.0
Large Commercial Packaged Air Conditioning and Heating Equipment	<135 kBtu/h, Water-Source, Central HP	COP ^f : 3.8	COP ^g : 4.2
	≥ 135 kBtu/h and <240 kBtu/h, Air-Cooled, Central AC	EER ^b : 8.5	EER ^b : 9.7
	≥ 135 kBtu/h and <240 kBtu/h, Air-Cooled, Central HP	EER ^b : 8.5, COP ^c : 2.9	EER ^b : 9.3, COP ^c : 3.1
	≥ 135 kBtu/h and <240 kBtu/h, Water cooled, Evaporatively-Cooled, Central AC	EER ^h : 9.6	EER ^h : 11.0
Packaged Terminal Air Conditioners and Heat Pumps	Air-Cooled	EER, COP vary by capacity (different formulas)	EER, COP vary by capacity (different formulas)
^a Heating efficiency levels do not apply to cooling only air conditioners. ^b At 95°F dry-bulb temperature. ^c At 47°F dry-bulb temperature. ^d At 85°F entering water temperature. ^e At 86°F entering water temperature. ^f At 70°F entering water temperature. ^g At 68°F entering water temperature. ^h According to ARI Standard 360.			

Table 3. Standard Levels for Furnaces, Boilers, Water Heaters, and Unfired Hot Water Storage Tanks

Product Category	Product Subcategory	Efficiency Level	
		EPCA	ASHRAE 90.1-1999
Warm Air Furnaces	≥ 225,000 Btu/h	Thermal Efficiency ^a : 80% Gas, 81% Oil	Thermal Efficiency ^a : 80% Gas, 81% Oil
Packaged Boilers	≥ 300,000 Btu/h	Combustion Efficiency ^a : 80% Gas, 83% Oil	Thermal Efficiency ^a : 75% Gas, 78% Oil
Storage Water Heaters	Electric	Standby Loss ^b : $0.3 + 27/V_a$ (%/h) (V_a =Measured Storage Volume in Gals.)	Standby Loss ^c : $20 + 35\sqrt{V}$ (Btu/h) (V =Rated Storage Volume in Gals.)
	Gas	Thermal Efficiency: 78%, Standby Loss ^b : Varies by Volume	Thermal Efficiency: 80%, Standby Loss ^c : Varies by Volume
	Oil	Thermal Efficiency: 78%, Standby Loss ^b : Varies by Volume	Thermal Efficiency: 78%, Standby Loss ^c : Varies by Volume
Instantaneous Water Heaters	V < 10 gal	Thermal Efficiency: 80%	Thermal Efficiency: 80%
	V ≥ 10 gal, Gas-fired	Thermal Efficiency: 77%, Standby Loss ^b : Varies by Volume	Thermal Efficiency: 80%, Standby Loss ^c : Varies by Volume
	V ≥ 10 gal, Oil-fired	Thermal Efficiency: 77%, Standby Loss ^b : Varies by Volume	Thermal Efficiency: 78%, Standby Loss ^c : Varies by Volume
Unfired Hot Water Storage Tanks	All	Heat Loss ^b : ≤ 6.5 Btu/hr/ft ²	R-12.5 Insulation
<p>^a At the maximum rated capacity.</p> <p>^b Storage water heaters and hot water storage tanks having more than 140 gallons of storage capacity need not meet the standby loss or heat loss requirement if the tank surface area is thermally insulated to R-12.5 and if a standing pilot light is not used.</p> <p>^c Water heaters having more than 140 gallons of storage capacity are not required to meet the standby loss requirement if the tank surface is thermally insulated to R-12.5, if a standing pilot light is not installed, and gas- or oil-fired storage water heaters have a flue damper or fan-assisted combustion.</p>			

In conducting the Screening Analysis, the Department used existing data from industry and other sources, including the analysis used by ASHRAE in support of its deliberations over the new ASHRAE/IESNA Standard 90.1-1999 efficiency levels. For each product category, we estimated the likely cost of achieving several higher technologically feasible efficiency levels and then calculated for each such level the corresponding rate of energy consumption required to fulfill the product's function. Applying appropriate climate data, typical building design characteristics, inventories of buildings in different regions of the country, equipment sales volumes, economic discount rates, and energy prices, we computed cost/benefit measures corresponding to the higher efficiency levels and also estimated the nationwide energy and net cost savings, if any, that would result from setting more stringent standards than the levels in ASHRAE/IESNA Standard 90.1-1999. While the conclusions of the Screening Analysis by themselves do not constitute clear and convincing

evidence to justify more stringent standards, they do serve to differentiate those products for which such evidence is unlikely to emerge from further analysis from those for which a reasonable likelihood exists.

The Department examined a range of efficiency levels for each product analyzed. The range included the levels specified in EPCA and ASHRAE/IESNA Standard 90.1-1999, as well as more efficient levels characteristic of the most efficient products now available in the market and those associated with the lowest life-cycle cost. For each level above the EPCA standard, DOE estimated: (1) The incremental national energy and carbon emission savings, and (2) the net nationwide direct economic benefit, represented by the national net present value (NPV), that would result from setting a standard at that level, compared to the corresponding levels now in ASHRAE/IESNA Standard 90.1-1999 and EPCA.

Table 4 lists the 24 product categories studied in the Screening Analysis. It shows for each one the efficiency level that the Screening Analysis indicates would correspond to the lowest average

life-cycle cost, taking into account both the costs of efficiency improvements and the savings from reduced energy consumption. In addition, where that efficiency level lies above the level specified in ASHRAE/IESNA Standard 90.1-1999, Table 4 shows the following potential benefits that the Screening Analysis suggests would result over the period from 2004 to 2030 from setting a standard at the higher level:

1. The estimated nationwide energy savings, expressed in trillions of Btu (TBtu);
2. The estimated net nationwide direct economic benefit, represented by the net present value (NPV); and
3. The estimated reductions in atmospheric carbon emissions, in millions of tons.

When Table 4 shows a zero for a product in all three of these categories, the Screening Analysis indicates that the efficiency level that corresponds with the product's lowest average life cycle cost is the same as the level specified in ASHRAE/IESNA Standard 90.1-1999.

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Table 4. Energy Savings, Net Present Value and Carbon Emission Reductions from 2004 to 2030 at Energy Efficiency Levels corresponding to Lowest Life-Cycle Cost

Product Category	Efficiency Level at Minimum Life-Cycle Cost	Relative to ASHRAE 90.1-1999		
		National Energy Savings (TBtu)	National Total NPV (Millions of 1998 \$'s)	National Carbon Emission Reductions (Million Tons)
3-Phase Single Package Air Source AC <65 kBtu/h	12.0	1,412.7	897.7	21
Central Air Source AC 135 - 240 kBtu/h	10.4	428.8	417.9	6
Packaged Terminal Air Conditioners	10.5	311.7	274.7	5
3-Phase Split Air Source AC <65 kBtu/h	11.0	278.6	109.1	4
Packaged Terminal Heat Pumps	9.9	249.0	241.9	4
Small Gas-Fired Boilers ≤ 2.5 MMBtu/h	78.7%	200.0	146.0	3
3-Phase Single Package Air Source HP <65 kBtu/h	12.0	183.6	91.3	3
Tankless Gas Instantaneous Water Heaters	81.5%	102.0	45.3	2
Large Gas-Fired Boilers >2.5 MMBtu/h	85.3%*	79.0	86.6	1
3-Phase Split Air Source HP <65 kBtu/h	12.0	66.4	47.0	1
Central, Water Source HP 17 - 65 kBtu/h	12.5	65.0	23.0	1
Central Air Source HP 135 - 240 kBtu/h	10.4	31.4	3.2	1
Electric Water Heater (120 gal)	1.0	6.6	1.1	0
Central Water Cooled AC 65 - 135 kBtu/h	12.4	2.7	0.8	0
Central Water Cooled AC 135 - 240 kBtu/h	11.5	2.5	3.0	0
Central Air Source AC 65 - 135 kBtu/h	10.3	0.0	0.0	0
Central Air Source HP 65 - 135 kBtu/h	10.1	0.0	0.0	0
Central Water Cooled AC <65 kBtu/h	12.1	0.0	0.0	0
Central Water Source HP <17 kBtu/h	11.2	0.0	0.0	0
Central Water Source HP 65 - 135 kBtu/h	12.0	0.0	0.0	0
Gas-Fired Warm Air Furnaces ≥ 225 kBtu/h	77.5%	0.0	0.0	0
Gas Storage Water Heaters ≤ 155 kBtu/h	80.0%	0.0	0.0	0
Gas Storage Water Heaters >155 kBtu/h	80.4%	0.0	0.0	0
Instantaneous Gas Water Heaters with Tanks	80.0%	0.0	0.0	0

* Efficiency shown is shipment-averaged value of Large Steam Boilers (76% - 81%), and Large Hot Water Boilers (78% - 88%)

On May 15, 2000, the Department published a Notice of Document Availability and Public Workshop (Workshop Notice), in which we described the Screening Analysis, announced the public availability of the Screening Analysis report, and published our preliminary inclinations with respect to the commercial heating, air conditioning, and water heating products covered by EPCA, including several product categories not included in the Screening Analysis. 65 FR 30929. We also invited comments and conducted a public workshop on July 11, 2000.

2. Discussion of Issues Raised Concerning the Screening Analysis

Several comments took issue with different aspects of the Screening Analysis. These views are listed below, along with DOE's responses. In general, many of the comments will be useful in more detailed evaluations of ASHRAE/IESNA 90.1-1999 efficiency levels which are not adopted as national standards in today's rule. On the other hand, none of the comments on the analysis itself indicates that clear and convincing evidence exists to justify more stringent standards than those adopted today.

Comment: DOE relied too heavily on equipment cost and efficiency relationships initially developed in 1994 for ASHRAE's deliberations in amending ASHRAE/IESNA Standard 90.1. These relationships are out of date and contain errors. (No. 8, Rheem Manufacturing Company, p. 1; No. 11, Air-Conditioning and Refrigeration Institute, p. 6; No. 16, California Energy Commission, p. 2; No. 19, American Council for an Energy-Efficient Economy, p. 3; No. 22, Lennox Industries, Inc., p. 3).

Response: DOE updated baseline cost data in the Screening Analysis through interviews with manufacturers, distributors and contractors and by application of appropriate price indices. However, the relative costs of alternative efficiency levels are assumed not to have changed since 1994. DOE did not expect that these costs had changed sufficiently to warrant collecting new independent data as part of an analysis to provide a framework for deciding which efficiency levels in ASHRAE/IESNA Standard 90.1-1999 to adopt, and which required further study. Notwithstanding, we did invite and receive public comments related to cost and efficiency relationships, and these are reflected in today's rule. The analysis in support of a future rulemaking for any product will entail collection of current cost and efficiency

data, which will be subjected to public comment.

Comment: The Screening Analysis should have included copies of all referenced material from non-published sources. (No. 15, GARD Analytics/Gas Research Institute, p. 2).

Response: Although DOE attempts to make all referenced material available to interested parties, including copies of this material in reports is not always practical due to its volume.

Comment: The seven percent discount rate, taken from OMB Circular A-94 to reflect the time value of money in DOE's economic analysis, is too low. (No. 2, Air Conditioning and Refrigeration Institute, p. 10; No. 11, Air-Conditioning and Refrigeration Institute, p. 7), or too high. (No. 12, American Gas Association, p. 3).

Response: DOE believes that the OMB guidance is appropriate, reflecting the approximate marginal pretax rate of return on average investments, expressed in real terms (net of inflation), for evaluating the economic impact of Federal actions on the economy. In pursuing further evaluation of products for which amended efficiency levels are not adopted in today's rule, DOE will account for differing opinions concerning discount rates through sensitivity analyses in evaluating the economic impact of standards on consumers and manufacturers. For example, in past rulemakings, DOE has evaluated the impact on consumer life-cycle-cost by considering alternative discount rates varying from two percent to fifteen percent.

Comment: DOE's level gas price projections underestimate the effect of gas industry restructuring and technological innovation. The Gas Research Institute projects a 1.5% annual decline in gas prices between 2000 and 2015. (No. 12, American Gas Association, p. 3).

Response: DOE considers the projections, taken from the Energy Information Administration's Annual Energy Outlook 2000, to be authoritative and reasonable for the purposes of the Screening Analysis. In addition, concerning products for which DOE is adopting ASHRAE/IESNA Standard 90.1-1999 levels, any decline in gas prices that does occur would likely make higher efficiencies less cost-effective for gas-fueled equipment and thus diminish the likelihood of uncovering clear and convincing evidence that more stringent standards are technically feasible and economically justified. For all covered gas-fueled products, except gas-fired boilers, DOE has decided to adopt the ASHRAE/IESNA Standard 90.1-1999

levels as they are, so any diminished likelihood of finding evidence to support more stringent standards for these products would serve to reinforce DOE's decision with respect to them. In evaluating the potential impacts of more stringent standards for gas-fired boilers, DOE will assess the impact of alternative fuel price scenarios on the life-cycle costs of achieving higher efficiency levels as well as the impacts of standards on the Net Present Value (NPV).

Comment: It is unclear whether the energy conversion factor in the Screening Analysis for electricity includes losses of fuel delivered to the powerplant. (No. 15, GARD Analytics/Gas Research Institute, p. 2).

Response: Losses of fuel delivered to the powerplant prior to combustion are not included in the conversion factors, but DOE considers these losses to be small in relation to the fuel actually consumed and thus to have little impact on national aggregate energy savings and greenhouse gas emissions reduction estimates.

Comment: The 15-zone prototype building model does not represent individual building types adequately, use of historical CBECs building data does not account for newer buildings built to 1989 and 1999 ASHRAE standards, not treating health care buildings as a separate category creates inaccuracy, and window-to-wall ratios seem too low. (No. 15, GARD Analytics/Gas Research Institute, p. 2).

Response: The 15-zone model provides estimates of building energy consumption which, DOE believes, are representative of most building types, and from which we can infer the effects of standards on products used in most building types with sufficient precision. We recognize that individual buildings may have different energy uses, depending on building location, operation, age and other building-specific factors. However, we believe this modeling approach is valid for the purpose of reaching a decision on whether the potential exists for additional energy savings, beyond those resulting from the adoption of the ASHRAE/IESNA Standard 90.1-1999 levels, that warrant consideration of higher standards.

Comment: Air conditioners and heat pumps often exceed the minimum energy efficiency level specified in EPCA, leading DOE to overestimate the energy savings impacts of more stringent standards. (No. 2, Air Conditioning and Refrigeration Institute, p.6; No. 4, Carrier Corporation, p. 4-5; No. 11, Air-Conditioning and Refrigeration Institute, p. 6; No. 13,

Carrier Corporation, p. 2; No. 22, Lennox Industries, Inc., p. 3). ARI believes the current shipment-weighted efficiencies for PTAC's and PTHP's exceed current minimum efficiency levels by about 10 percent. (No. 11, Air-Conditioning and Refrigeration Institute, p. 4).

Response: To the extent DOE, in computing the base case, *i.e.*, no adoption of a further standard, used an average efficiency lower than what actually occurs, ARI may have a valid point because a more stringent standard would result in lower energy savings than what was estimated. But ARI has provided no data to indicate the amount of the possible overstatement of energy savings. Moreover, to some extent, any such overstatement would be offset because, for the purpose of this analysis, we also assumed that under new standards the average efficiency would be equal to the new standard. We expect the shipment-weighted efficiency to be higher than the standard, however, and this would have the effect of modestly underestimating the energy savings due to standards. Aside from these considerations, given the amount of energy that could potentially be saved by more stringent standards on these products, even if it is less than estimated, we believe they warrant further consideration as candidates for more stringent standards. In evaluating the impacts of more stringent standards, DOE will attempt to capture the effect of the market demand for more efficient products than required by a minimum efficiency standard.

Comment: Use of Full Load Equivalent Operating Hours (FLEOH's) overstates energy consumption by air conditioning equipment, since part-load operation is more efficient than at full load for this equipment. (No. 2, Air Conditioning and Refrigeration Institute, p. 8; No. 4, Carrier Corporation, p. 4; No. 11, Air-Conditioning and Refrigeration Institute, p. 4; No. 13, Carrier Corporation, p. 2–3; No. 15, GARD Analytics/Gas Research Institute, p. 1; No. 22, Lennox Industries, Inc., p. 3).

Response: DOE agrees that FLEOH's do not capture the part load performance of products. The Department used FLEOH's for the Screening Analysis because of a limited amount of part load efficiency data and because the standard under investigation is expressed in terms of full load operation. DOE believes that any discrepancies introduced by use of FLEOH's would not materially alter the likelihood that clear and convincing evidence supporting stricter standards will ultimately be found, because efficiencies at full and part load are

correlated. Nonetheless, the Department welcomes suggestions concerning better ways to account for performance under part-load conditions as it conducts further analysis of air-conditioning products.

Comment: DOE understated energy costs for air conditioners by failing to account adequately for seasonal electric rate variation and demand charges. (No. 15, GARD Analytics/Gas Research Institute, p. 1, 2; No. 19, American Council for an Energy-Efficient Economy, p. 5–6).

Response: The Screening Analysis includes calculations of energy savings and life-cycle costs for specific products at regional and national levels, and DOE believes that it handled electric costs appropriately, based on surveys of actual rate data, and that its conclusions reflect existing market conditions today. DOE recognizes, however, that rate levels and structures could change in the future in unpredictable ways with utility industry restructuring, but we believe that this uncertainty does not remove the reasonable likelihood that more stringent standards may be justified in the case of products DOE plans to analyze further, nor does uncertainty by itself make finding such a justification appreciably more likely in the case of products for which DOE is adopting standards in today's rule. Any seasonal rates and demand charges that increase the cost of energy consumed by air conditioners will serve to make more stringent efficiency requirements cost-effective, thus reinforcing DOE's decision to study air-cooled air conditioners further before adopting the levels contained in ASHRAE/IESNA Standard 90.1–1999. For water-cooled air-conditioners, DOE is adopting ASHRAE/IESNA Standard 90.1–1999 efficiency requirements today, because these products are less common and for this reason do not appear to afford opportunities for significant energy savings. This determination does not depend on the cost of electric power. In conducting further investigation of electric product efficiencies, we may also apply appropriate sensitivity analysis to capture prevailing ranges of opinion concerning the various rate scenarios. We welcome suggestions from stakeholders regarding better methodologies to account for seasonal rates and demand charges within any detailed rulemaking, including suggestions on how to address their wide variety in the commercial sector (e.g., specific utility service territory, type of building, end-use application, hours of usage, prior usage patterns, and correlations with kWh consumption).

Comment: Heating operation should be included along with cooling in analyzing heat-pumps, since cooling efficiency improvements can reduce energy costs for heating as well. (No. 15, GARD Analytics/Gas Research Institute, p. 1).

Response: DOE agrees with this point and will include heating and cooling operations together in the detailed analysis of efficiency levels for air-source heat pumps. Higher efficiencies in cooling mode are likely to result in improved heating performance as well, increasing the likelihood that higher standards for these products are economically justified and will lead to significant additional conservation of energy. This consideration therefore reinforces DOE's decision to conduct further analysis of air-source heat pumps along with corresponding air-source air-conditioners. For water-source heat pumps, DOE is adopting ASHRAE/IESNA Standard 90.1–1999 efficiency requirements, because these products are less common and for this reason do not appear to afford opportunities for significant energy savings. This determination does not depend on the combined cost or efficiency of heating and cooling.

Comment: Cost and efficiency relationships used by ASHRAE and subsequently in the Screening Analysis reflect use of R–22 refrigerant, which must be replaced by 2010. (No. 2, Air Conditioning and Refrigeration Institute, p. 9–10; No. 8, Rheem Manufacturing Company, p. 1; No. 11, Air-Conditioning and Refrigeration Institute, p. 6).

Response: DOE recognizes the possibility that alternatives to R–22 may alter the cost effectiveness of achieving higher efficiency levels for equipment sold after 2010 and will take this factor into account in conducting further analysis of air-source heat pumps and air-cooled air-conditioners. Since the effect of as yet undetermined alternative refrigerants on the cost of achieving higher efficiency levels is unknown at this point and the subject of debate, DOE does not believe that the refrigerant requirement eradicates the reasonable likelihood of uncovering evidence supporting higher standards for air-cooled products. As indicated above, the decision to adopt ASHRAE 90.1–1999 efficiency requirements for water-source, water-cooled, and evaporatively cooled equipment stems from low aggregate energy consumption and not cost-effective efficiency considerations.

Comment: DOE's analysis of packaged terminal air conditioners and heat pumps does not accurately reflect the life and usage characteristics of these products, thereby incorrectly estimating

the energy savings and life-cycle-cost effects of more stringent standards. Packaged terminal air conditioners and heat pumps have a useful life of 10 years or less, not 15 as assumed in the Screening Analysis. The shorter lifetime is due to application in hotels and motels, which undergo more frequent renovations, and to corrosion from salt near the seacoast. (No. 2, Air Conditioning and Refrigeration Institute, p. 6; No. 4, Carrier Corporation, p. 3; No. 11, Air-Conditioning and Refrigeration Institute, p. 4; No. 13, Carrier Corporation, p. 2; No. 14, EnviroMaster International Corporation, p. 2). The "generic building" approach to estimating heating and cooling loads fails to reflect the unique design characteristics of hotels and motels, where PTAC's and PTHP's are most commonly used. (No. 11, Air-Conditioning and Refrigeration Institute, p. 4). These products are used less during hours of peak electric demand than other air-conditioning equipment, since the rooms are frequently vacant during the day. (No. 14, EnviroMaster International Corporation, p. 1).

Response: DOE accepts the possibility that the lifetime assumed for these products in the Screening Analysis may not reflect the likelihood of the units being replaced earlier during routine renovations. A more frequent replacement would increase the cost associated with these products. It is also possible that these products are used less during hours of peak electric demand than other air-conditioning products and thus do not conform to a "generic building" operating schedule, and that a different operating schedule may be warranted for them during analyses. Although shorter working life and fewer hours of operation under peak conditions would reduce the estimated energy and cost savings associated with more stringent standards, the potential saving identified by the Screening Analysis for these products is so large, in DOE's view, as to compensate for the simplifying assumptions involved in calculating them. Potential national energy savings of over 500 trillion Btu for packaged terminal heat pumps leaves considerable room for error in determining that a reasonable likelihood exists that evidence would support more stringent standards. However, we welcome additional independent data

on equipment life and operating schedules for these products, so we can improve the precision of the detailed analysis we will be undertaking for these products.

Comment: DOE overestimated the feasibility and underestimated the cost of improving efficiencies of PTAC's and PTHP's by failing to take into account the small wall openings (16" by 42") into which they must fit, especially for retrofit applications. (No. 2, Air Conditioning and Refrigeration Institute, p. 7-8; No. 4, Carrier Corporation, p. 3; No. 9, First Company, p. 2; No. 11, Air-Conditioning and Refrigeration Institute, p. 5; No. 13, Carrier Corporation, p. 2; No. 14, EnviroMaster International Corporation, p. 1). Also, DOE failed to account for recently introduced "vertical" PTAC's, which have different design constraints from traditional units covered by the analysis. (No. 14, EnviroMaster International Corporation, p. 1).

Response: DOE will model PTAC's and PTHP's performance in simulated environments that match their actual applications as closely as possible. However, the comments contain no conclusions bearing on the impact of these two sets of considerations on DOE's decision to continue its evaluation of these products before adopting uniform national efficiency standards for them, and DOE does not believe that the considerations eliminate the reasonable likelihood of uncovering evidence supporting more stringent standards under the terms of EPCA.

Comment: The Screening Analysis may not have correctly reflected the preponderance of commercial boiler shipments to the Northeast and North Central regions of the country, greatly overstated shipments of copper tube or coil-type commercial gas water heaters, and overestimated potential energy savings for these products. (No. 20, Gas Appliance Manufacturers Association, p. 1-3). Fluctuations in the GAMA shipment data for gas water heaters need further explanation, and the projected one percent annual growth rate for water heaters until 2030 is overly optimistic. (No. 12, American Gas Association, p. 3, 4). The shipment figures for oil-fired boilers appear too high, possibly because they include dual-fuel boilers, and the analysis does not adequately account for differences in boiler installation costs at higher

efficiencies. (No. 15, GARD Analytics/Gas Research Institute, p. 2).

Response: DOE will verify shipment data during its further analysis of boilers and tankless water heaters, and we will account for differences in installation costs at higher efficiencies. However, DOE does not believe that these considerations remove the reasonable likelihood of discovering adequate evidence to support more stringent standards for these products according to EPCA criteria. Installation is only a small component of the total cost of acquisition, and alternative shipping patterns and growth rates could effect energy savings and economic justification either way. Greater predominance of shipments to states with colder climates, for example, increases the likelihood that more stringent standards would be cost effective, while slower growth in shipments diminishes the energy savings likely to result from higher efficiencies in the future.

Comment: The Screening Analysis did not handle jacket and standby losses properly. (No. 20, Gas Appliance Manufacturers Association, p. 1-3).

Response: With regard to jacket and standby loss, we believe that the Standby Loss Correction for boilers is in fact needed to estimate the energy use of these devices correctly. The difference between thermal and combustion efficiency is primarily reflected in the shell loss of the boiler, and during operating hours, the thermal efficiency of the boiler accounts for these losses. However for much of the year, the boiler is maintained on a hot standby status. The amount of time on hot standby is assumed in the Screening Analysis to be the total number of hours the boiler is available for use minus the full load operating hours for the year. Values for the hot standby periods were taken from the 1997 ASHRAE Handbook of Fundamentals, as shown in Appendix A (A.9) of the Screening Analysis. During these hot standby periods, we have assumed the boiler standby loss to be 5% for the base boiler (the assumed difference between combustion and thermal efficiency). To capture the energy used during the hot standby period, the Screening Analysis applied an adjustment factor for the FLEOH, calculated as:

$$\text{AdjustmentFactor} = \frac{\text{FLEOH} + (\text{AvailableHours} - \text{FLEOH}) \times \% \text{ShellLoss}}{\text{FLEOH}}$$

Variation in boiler design or setback of system temperature through the year will have some effect on this adjustment factor, however for purposes of the Screening Analysis, we believe the methodology outlined above to be a fair assessment of the contribution of hot standby to energy consumption.

Comment: In the amended ASHRAE/IESNA Standard 90.1-1999, ASHRAE changed the definition of "storage volume" for electric storage water heaters from "measured volume" to "rated volume." (No. 16, California Energy Commission, p. 3; No. 17, Oregon Office of Energy, p. 3).

Response: DOE recognized this change and accounted for it in the Screening Analysis.

B. Treatment of Specific Products

1. DOE Views Expressed in the Workshop Notice

In the Workshop Notice, DOE stated its inclination to adopt as national standards, without further study, the efficiency levels in ASHRAE/IESNA Standard 90.1-1999 for 12 of the 24 products included in the Screening Analysis. 65 FR at 30933, 30935. The 12 products comprise several categories of air conditioners and heat pumps, warm air furnaces, and certain water heating products. DOE stated that the Analysis estimated that most of these efficiency levels have the lowest life-cycle cost (LCC) for the product, and for the remainder a slightly higher efficiency would have the lowest LCC but would save relatively little additional energy.

For four categories of 3-phase air conditioners and heat pumps with capacities under 65,000 Btu per hour, DOE stated its inclination to take no action to adopt standards at this time but to encourage ASHRAE to consider an addendum to ASHRAE/IESNA Standard 90.1-1999. 65 FR at 30933-34, 30935. DOE noted that ASHRAE did not address these products in revising Standard 90.1, although the Screening Analysis indicates that higher efficiency standards for them may well have benefits.

For seven of the eight remaining categories analyzed in the Screening Analysis, DOE stated its inclination to propose consideration of an addendum to ASHRAE/IESNA Standard 90.1-1999, and to further study whether more stringent efficiency levels than those adopted by ASHRAE are warranted. 65 FR at 30934, 30935. DOE stated that it appears such levels would result in significant, cost-effective energy savings. The products involved are certain types of air conditioners and heat pumps, as well as boilers and

tankless instantaneous gas water heaters. Electric water heaters was the other product included in the Analysis, and DOE tentatively decided to leave the EPCA standard in force based on its view that the efficiency level in ASHRAE/IESNA Standard 90.1-1999 would increase energy use relative to that standard. 65 FR at 30934, 30935.

DOE excluded certain commercial air conditioning, heating and water heating products from the Screening Analysis for reasons such as insufficient data, small sales volumes, and difficulty in assessing efficiency performance. 65 FR at 30934. For several of these products, DOE stated its intent to adopt ASHRAE/IESNA Standard 90.1-1999 standards because the products have small markets and higher standards are unlikely to result in significant energy savings. For the heating COP of several heat pump categories, and the efficiency level for oil-fired boilers, DOE indicated it did not plan to adopt the levels in ASHRAE/IESNA Standard 90.1-1999 because they should be considered either as part of other evaluations that would be undertaken or subsequent to such other evaluations. 65 FR at 30934-35. For all other heat pumps covered by EPCA, DOE stated its intention to adopt the amended ASHRAE/IESNA Standard 90.1-1999 COP levels as uniform national standards.

2. Discussion of Comments on General Issues Surrounding Adoption of Efficiency Standards in ASHRAE/IESNA Standard 90.1-1999

Comment: Stakeholders were divided on DOE's discretion to impose more stringent standards than those in ASHRAE/IESNA Standard 90.1-1999 and on the Department's duty to scrutinize each efficiency level strictly. Some emphasized the limitations on DOE's authority to set more stringent standards than those contained in ASHRAE 90.1-1999 in the absence of certain clear and convincing evidence, and they encouraged adoption of ASHRAE's amended standards in their entirety. (No. 2, Air Conditioning and Refrigeration Institute, pp. 4-5; No. 3, Gas Appliance Manufacturers Association, pp. 1-2; No. 10, Edison Electric Institute, pp. 1-2; No. 11, Air-Conditioning and Refrigeration Institute, p. 3). Others emphasized what they felt was DOE's duty to seek such evidence more exhaustively before adopting any of the ASHRAE standards. (No. 16, California Energy Commission, pp. 1-2; No. 17, Oregon Office of Energy, pp. 1-2; No. 19, American Council for an Energy-Efficient Economy, pp. 1, 10-11)

Response: DOE believes it has struck an appropriate balance, consistent with

EPCA, between the requirement to adopt the efficiency standards contained in ASHRAE/IESNA Standard 90.1-1999 and the discretion to adopt more stringent standards if they are warranted by clear and convincing evidence. Specifically, DOE performed a Screening Analysis of the amended standards in ASHRAE/IESNA Standard 90.1-1999, and invited public comments on the Analysis, in order to assess the likelihood of uncovering such clear and convincing evidence. Based on those steps, DOE is adopting in today's rule over half of the amended standards in ASHRAE Standard 90.1-1999, and is undertaking further analysis of virtually all of the remaining ASHRAE standards. The Department believes it is exercising due care in performing the role defined in the statute for the Secretary.

Comment: Numerous comments addressed ASHRAE's process in arriving at ASHRAE/IESNA Standard 90.1-1999. Several comments commended ASHRAE for its analytical and procedural integrity and recommended adopting the resulting standards on the strength of ASHRAE's process. (No. 1, ASHRAE, p. 1; No. 2, Air Conditioning and Refrigeration Institute, pp. 2-3; No. 4, Carrier Corporation, p. 1; No. 10, Edison Electric Institute, p. 1; No. 11, Air-Conditioning and Refrigeration Institute, pp. 2-3; No. 13, Carrier Corporation, p. 1; No. 18, National Rural Electric Cooperative Association, p. 1; No. 22, Lennox Industries, Inc., p. 2). Others criticized ASHRAE's process for analytical and procedural shortcomings and recommended strict scrutiny of the standards. (No. 5, California Energy Commission, pp. 1-2; No. 16, California Energy Commission, pp. 2-3; No. 17, Oregon Office of Energy, pp. 1-4; No. 19, American Council for an Energy-Efficient Economy, pp. 1-3).

Response: DOE recognizes that opinions differ on the strengths and weaknesses of ASHRAE's process in arriving at the requirements in Standard 90.1-1999. Nevertheless, EPCA stipulates that DOE must adopt the amended ASHRAE standards unless certain conditions are met, and, for the reasons stated in our response to the previous comment, we believe our actions here properly reflect the status that EPCA affords to Standard 90.1-1999.

Comment: Subjecting standards to further DOE analysis would delay the realization of energy savings that might occur sooner if amended ASHRAE standards were adopted immediately. (No. 8, Rheem Manufacturing Company, p. 1). On the other hand, voluntary adherence to the amended standards

and state adoption of the updated ASHRAE/IESNA Standard 90.1-1999 in building codes will serve to offset the effect of any delay at the Federal level. (No. 16, California Energy Commission, pp. 4-5; No. 17, Oregon Office of Energy, p. 4). In addition, DOE's further analysis could create a situation in which manufacturers would have to redesign their products twice in rapid succession: Once to comply with ASHRAE/IESNA Standard 90.1-1999 and shortly afterward, to comply with standards resulting from a possible DOE rulemaking. (No. 4, Carrier Corporation, p. 2; No. 11, Air-Conditioning and Refrigeration Institute, p. 7; No. 13, Carrier Corporation, p. 3; No. 14, EnviroMaster International Corporation, p. 2; No. 22, Lennox Industries, Inc., p. 3-4).

Response: Any future rulemaking by DOE will take into account the impacts of more stringent standards on affected manufacturers, including the effect of timing on product development cycles, and it will analyze the influence of effective dates on energy savings resulting from the standards. DOE notes also that the process it envisions can be terminated for any product whenever DOE concludes that the EPCA criteria for a more stringent standard are not likely to be satisfied. This could occur either as a result of further analysis by DOE during a rulemaking process or by ASHRAE adopting a new Addendum to ASHRAE/IESNA Standard 90.1-1999 for which a more stringent alternative is not justified.

Comment: DOE has no authority to propose that ASHRAE consider addenda to Standard 90.1 in cases where it feels that the requirements in ASHRAE/IESNA Standard 90.1-1999 are not sufficiently stringent. In these cases, the Department must proceed with a rulemaking if higher efficiencies meet the requirements of EPCA. (No. 12, American Gas Association, pp. 1-2).

Response: While EPCA does not specifically authorize the Department to propose addenda to ASHRAE standards, DOE can find no statutory prohibition against doing so and indeed has traditionally provided technical support to ASHRAE's standard-setting processes in the interest of encouraging and taking advantage of open, consensus-based approaches. In addition, section 307(b) of the Energy Conservation and Production Act, 42 U.S.C. 6836, seems to contemplate that DOE would provide such support to ASHRAE, and even that it would propose addenda to ASHRAE.

3. Discussion of DOE Views Regarding Specific Products

Comment: Industry data used in ASHRAE's standard setting process and DOE's Screening Analysis overstated the cost of efficiency improvements for central air-source air-conditioners between 65,000 Btu per hour and 135,000 Btu per hour. (No. 19, American Council for an Energy-Efficient Economy, pp. 3-5). Some industry comments opposed this view. (No. 11, Air-Conditioning and Refrigeration Institute, p. 5; No. 13, Carrier Corporation, p. 3).

Response: Since the American Council for an Energy-Efficient Economy (ACEEE) supported its contention regarding air-source air-conditioners with price survey data, and the potential savings from efficiency improvements for this product category are potentially large on account of its widespread use, DOE has decided that clear and convincing evidence may exist to justify more stringent standards for air-source air-conditioners in the 65,000 Btu/h to 135,000 Btu/h range. The Department has therefore added this product category to those that will be subjected to further study and will review the cost-efficiency data.

Comment: Industry data used in ASHRAE's standard setting process and DOE's Screening Analysis also overstated the cost of efficiency improvements for 3-ton water-source heat pumps. (No. 19, American Council for an Energy-Efficient Economy, pp. 3-5).

Response: For water-source heat pumps, the data to support the ACEEE comment is considered proprietary and has not been submitted to DOE, so the Department is unable to verify the comment. In any case, the nation-wide energy use for this product appears to be so small that the Department considers it unlikely that more stringent standards for this product would satisfy EPCA criteria. Accordingly, the Department is adopting the ASHRAE/IESNA Standard 90.1-1999 efficiency level for this product category in today's rule.

Comment: Industry data used in ASHRAE's standard setting process and DOE's Screening Analysis also overstated the cost of efficiency improvements for gas-fired boilers. (No. 19, American Council for an Energy-Efficient Economy, pp. 3-5).

Response: Since the gas-fired boilers are proposed to be analyzed further, based on the Screening Analysis, ACEEE's comment would not affect the decision embodied in today's rule.

Comment: DOE should include Integrated Part-Load Values in standards

governing air conditioning equipment. (No. 16, California Energy Commission, p. 5; No. 17, Oregon Office of Energy, p. 3).

Response: DOE recognizes that Integrated Part-Load Value is increasingly common as a rating metric and believes that it has the authority to establish minimum requirements using this metric if ASHRAE has amended the standard corresponding to the air-conditioning equipment in question, and EPCA's requirements for a more stringent standard are met. DOE is also aware that Integrated Part Load Value only applies to the performance of equipment with modulated capacity and thus will not capture part-load efficiencies for most single-stage air-conditioners. DOE will therefore consider including Integrated Part-Load Values in any prospective rulemaking for air conditioning equipment. However the Department has reached no conclusions on their appropriateness as part of a future standard and will seek public comment before proceeding.

Comment: Standards for 3-phase air-conditioners and heat pumps under 65,000 Btu per hour should be the same as those for single phase models, which are used in residential applications and are more numerous. (No. 8, Rheem Manufacturing Company, p. 2; No. 11, Air-Conditioning and Refrigeration Institute, pp. 3-4; No. 12, Carrier Corporation, p. 3; No. 22, Lennox Industries, Inc., p. 2-3).

Response: DOE agrees that the products are closely related, and that standard-setting for them should be coordinated. There may be valid reasons, however, for the standards themselves to differ. Once ASHRAE/IESNA Standard 90.1-1999 is amended with respect to these products, DOE will evaluate the new standards to determine if they should be adopted or if a more stringent standard is likely to save a significant amount of energy, and be technologically feasible and economically justified.

Comment: More stringent standards for gas space heating and water heating equipment will serve to shift customers to electric equipment, with a detrimental effect on gas equipment sales and energy consumption. (No. 12, American Gas Association, p. 2). Further changes in efficiency levels for PTAC's and PTHP's will particularly hurt small manufacturers. (No. 9, First Company, p. 3).

Response: Under EPCA, if DOE adopts a more stringent standard, it must consider, to the greatest extent practicable, the economic impact on the manufacturers and consumers of the affected products, savings in operating

cost throughout the life of the product compared to any increases in initial cost or maintenance expense, and the total projected amount of energy savings likely to result directly from the imposition of the standard. EPCA section 342(a)(6)(B)(i), 42 U.S.C. 6313(a)(6)(B)(i). DOE will therefore carefully consider possible effects due to fuel switching as well as impacts on small businesses as it proceeds with any further analysis of these products that might lead to more stringent standards.

Comment: More stringent standards could affect the availability of types of boilers that have no cost-effective substitute for certain building applications. (No. 3, Gas Appliance Manufacturers Association, pp. 2–5). They could also affect the availability of PTAC's and PTHP's that will fit in existing limited spaces. (No. 9, First Company, pp. 1–2).

Response: DOE recognizes that EPCA prohibits an amended standard that is likely to result in unavailability in the United States of products with performance characteristics (including reliability), features, sizes, capacities and volumes that are substantially the same as those generally available beforehand. EPCA section 342(a)(6)(B)(ii), 42 U.S.C. 6313(a)(6)(B)(ii). This prohibition would govern any future rulemaking with respect to these products.

Comment: Since ASHRAE amended the standard for electric water heaters, DOE has the authority to evaluate and consider more stringent standards than those in EPCA for these products and should do so. (No. 15, GARD Analytics/Gas Research Institute, p. 2; No. 16, California Energy Commission, p. 3). Heat pump water heaters should be considered among the technological alternatives. (No. 15, GARD Analytics/Gas Research Institute, p. 2)

Response: DOE agrees with the comment regarding DOE's authority. However, in rejecting the ASHRAE/IESNA Standard 90.1–1999 provision, which allows for increased energy consumption, the Department does not intend to subject electric water heaters to further evaluation or consideration of more stringent standards. The standard for electric water heaters will remain as originally stipulated in EPCA. This decision is based on the low likelihood of finding sufficient evidence to support a more stringent standard for them. The heat pump water heater is the most promising (but significantly more complex) technology to significantly improve the heating efficiency of electric water heaters above current levels. However, when DOE considered this technology for our residential water

heater rulemaking, we concluded that it was not economically justified due to the cost of manufacturing, installing, servicing, and sometimes a potential loss of product utility. These concerns might also apply to commercial heat pump water heaters. Furthermore, currently there is no suitable test procedure for these products to measure the efficiency in commercial applications, so a standard predicated on heat pump technology would be difficult to enforce.

C. Final Rule and Other DOE Actions

EPCA requires DOE to adopt ASHRAE's amended efficiency standards for certain commercial heating, air conditioning and water heating products unless the Secretary determines, supported by clear and convincing evidence, that adoption of a more stringent uniform national standard is technologically feasible and economically justified and would result in significant additional energy conservation. DOE believes that this language places a burden on DOE not to initiate a standards development process unless there is at least a reasonable possibility that strong evidence exists to show that significant additional energy savings could be achieved through more stringent efficiency standards that would be both technologically feasible and economically justified.

To decide whether to adopt efficiency standards contained in ASHRAE/IES Standard 90.1–1999, or to initiate the process of developing and analyzing more stringent standards for particular product categories, DOE performed a simplified Screening Analysis and evaluated other information. This process was designed to identify products covered by EPCA for which it was reasonable to expect that more detailed and sophisticated analysis was unlikely to reveal evidence sufficient to justify more stringent requirements, and also to identify other products for which such evidence was reasonably likely to be revealed by further analysis. Screening products in this way allows DOE to adopt several ASHRAE 90.1–1999 standards expeditiously and thereby to:

- Minimize any possible adverse effects on energy savings of delaying the imposition of more stringent national efficiency standards;
- Minimize uncertainty faced by manufacturers as they design products to meet future standards; and
- Manage the resources within DOE efficiently, concentrating comprehensive analyses of the cost-effectiveness and energy savings of

alternatives to ASHRAE standards where the clear and convincing evidence required by EPCA for more stringent standards is most likely to be found.

As further discussed below, based on evaluation of the results of the Screening Analysis, other information for products not included in the analysis, and the comments received in response to the Workshop Notice, the Department has decided to pursue, for each product category, one of four courses of action:

- Adopt immediately the ASHRAE/IES Standard 90.1–1999 efficiency level as a uniform national standard;
- Propose consideration of an addendum to ASHRAE/IES Standard 90.1–1999 where ASHRAE did not consider a more efficient level, and a more efficient level appears warranted;
- Propose consideration of an addendum to ASHRAE/IES Standard 90.1–1999 and undertake a more thorough evaluation to determine whether a higher standard is justified, where ASHRAE considered amending or amended the standard, and a more efficient level appears warranted than is contained in ASHRAE/IES Standard 90.1–1999; or
- Reject the ASHRAE/IES Standard 90.1–1999 efficiency level if it increases maximum allowable energy use or decreases minimum required efficiency.

As to the ASHRAE 90.1–1999 efficiency levels that DOE is immediately adopting, these standards are being adopted because (a) significant improvements in energy efficiency beyond the level recommended by ASHRAE appear unlikely to be technically feasible or economically justified, (b) the national energy savings that would result from any cost-effective efficiency improvements appear unlikely to be significant, or (c) the additional energy savings resulting from a more stringent standard are not likely to offset the loss in energy savings likely to result from the delay that would be caused by the DOE analytical and rulemaking process.

As to efficiency levels in the third category above—where DOE is proposing further consideration by ASHRAE and undertaking further analysis—DOE selected these products for further analysis, because the findings of the Screening Analysis suggested at least a reasonable possibility, and in several instances a high likelihood, of uncovering clear and convincing evidence that more stringent standards would be technologically feasible and economically justified and would result in significant additional energy conservation. Implicit in DOE's

selection is the judgment that additional energy savings resulting from more stringent standards are likely to offset the loss in energy savings likely to result from the delay in the imposition of a new standard due to DOE's analytical and rulemaking process.

Based on our consideration of the Screening Analysis, DOE has identified the ten products listed below as not warranting further consideration of standards that are more stringent than those in ASHRAE/IESNA Standard 90.1-1999 and is consequently adopting the ASHRAE/IESNA Standard 90.1-1999 efficiency levels for these products today as uniform national standards.

- Central Water Source Heat Pumps, 17 kBtu/h–65 kBtu/h
- Central Water Cooled Air Conditioners, 65 kBtu/h–135 kBtu/h
- Central Water Cooled Air Conditioners, 135 kBtu/h–240 kBtu/h
- Central Water Cooled Air Conditioners, <65 kBtu/h
- Central Water Source Heat Pumps, <17 kBtu/h
- Central Water Source Heat Pumps, 65 kBtu/h–135 kBtu/h
- Gas-Fired Warm Air Furnaces, ≥225 kBtu/h
- Gas Storage Water Heaters, ≤155 kBtu/h
- Gas Storage Water Heaters, >155 kBtu/h
- Gas Instantaneous Water Heaters with Tanks

In all except the first three of the ten product categories listed above, the ASHRAE/IESNA Standard 90.1-1999 efficiency levels are the same as those identified in the Screening Analysis as achieving the lowest life-cycle costs. Therefore, the Department considers it unlikely that further analysis would reveal clear and convincing evidence that more stringent standards would be economically justified for these products. For the central water-source heat pumps between 17 and 65 thousand Btu/hour, and the two sizes of central water-cooled air conditioners between 65 and 240 thousand Btu/hour, the Screening Analysis estimates that the efficiency levels corresponding to minimum life-cycle cost are slightly higher than ASHRAE's, but the total cumulative energy savings that could be achieved cost-effectively by adopting the three higher levels would amount to only 70 trillion Btu between 2004 and 2030. In the case of these products, for which potential energy savings appear to be relatively small, the Department considers it unlikely that further analysis would reveal clear and convincing evidence that a more stringent standard would result in significant energy conservation.

Of the remaining products studied in the Screening Analysis, the Analysis suggests that efficiency standards higher than those in ASHRAE/IESNA Standard 90.1-1999 for four categories of 3-phase air conditioners and heat pumps with capacities under 65,000 Btu per hour may well have significant energy savings potential and economic benefits. According to the Screening Analysis, adopting the efficiency levels corresponding to the lowest average life-cycle cost for all four of these product categories would result in estimated cost-effective nationwide cumulative energy savings of as much as 1.9 quadrillion Btu between 2004 and 2030, leading the Department to believe that further evaluation could reasonably be expected to uncover clear and convincing evidence supporting a more stringent standard. However, these products were not addressed by ASHRAE in revising ASHRAE/IESNA Standard 90.1, so DOE has decided not to take any action at this time to adopt a standard with respect to them. Based on the results of the Screening Analysis, DOE encourages ASHRAE to consider adopting an addendum to ASHRAE/IESNA Standard 90.1-1999 and will support ASHRAE in its future deliberations concerning these products in conjunction with ongoing development of NAECA standards for similar, but single phase, residential equipment. Should ASHRAE amend the efficiency standards for these air conditioners or heat pumps in the future, DOE will then act on such amendments as required by EPCA. The four categories of 3-phase air conditioners and heat pumps with capacities under 65,000 Btu per hour are:

- 3-phase Single Package Air Source Air Conditioners, <65 kBtu/h;
- 3-phase Split Air Source Air Conditioners, <65 kBtu/h;
- 3-phase Single Package Air Source Heat Pumps, <65 kBtu/h; and
- 3-phase Split Air Source Heat Pumps, <65 kBtu/h.

For seven of the eight remaining product categories analyzed, ASHRAE amended the efficiency standards contained in ASHRAE/IESNA Standard 90.1, but the Screening Analysis indicates that it is at least reasonably likely that significant, cost-effective energy savings would result from even more stringent standards. Therefore, DOE believes that the clear and convincing evidence required by EPCA may well be revealed by further analysis. These products are the following:

- Central air-source air conditioners, 135 kBtu/h–240 kBtu/h;

- Central air-source heat pumps, 135 kBtu/h–240 kBtu/h;
- Packaged terminal air conditioners;
- Packaged terminal heat pumps;
- Small gas-fired steam and hot water boilers, 0.3 MMBtu/h–2.5 MMBtu/h;
- Large gas-fired steam and hot water boilers, >2.5 MMBtu/h; and
- Tankless Gas Instantaneous Water Heaters.

Although the Screening Analysis did not identify a potential for cost-effective energy savings for central air-cooled air conditioners and air-source heat pumps between 65 kBtu/h and 135 kBtu/h, the Department received public comments that included data, derived from sale price surveys, supporting the contention that higher efficiencies could be achieved at lower cost than indicated in the Screening Analysis for these products. Based on the data we received, the Department believes that evidence to support more stringent standards is sufficiently likely to be uncovered by further study to warrant a more thorough evaluation, with resources allocated within the Department's priority-setting framework, to determine whether higher standards are justified under the terms of EPCA for these products. DOE also intends to propose consideration of an addendum to ASHRAE/IESNA Standard 90.1-1999.

For one product category, electric water heaters, the new efficiency level in ASHRAE/IESNA Standard 90.1-1999 would increase energy consumption relative to the standard in EPCA. Under these circumstances, DOE cannot adopt the new level, since EPCA stipulates that the standards it contains cannot be relaxed. Therefore, DOE is not adopting the requirement in ASHRAE/IESNA Standard 90.1-1999 for this product, and the original standard remains in force.

Eighteen commercial products covered by Section 342(a) of EPCA were not analyzed in the Screening Analysis. These products, for which performance characteristics were not analyzed in detail, fall into groups as follows:

- Heating coefficients of performance (COP) and heating seasonal performance factors (HSPF) for all heat pump product categories;
- Efficiencies of water-cooled air conditioners and water-source heat pumps with capacities between 135 kBtu/h and 240 kBtu/h;
- Evaporatively cooled air-conditioning products;
- Oil-fired warm air furnaces, storage and instantaneous water heaters, and packaged boilers; and
- Unfired hot water storage tanks

DOE believes that the water-cooled and evaporatively cooled air-conditioning products, oil-fired warm air furnaces and water heaters, and unfired hot water storage tanks have small markets and are therefore unlikely to represent significant energy savings as required to justify more stringent standards under EPCA, so we are adopting ASHRAE/IESNA Standard 90.1-1999 standards for these products in today's rule. Since the heating COP is closely related to the cooling efficiency for heat pumps, DOE is not adopting at this point the heating COP levels contained in ASHRAE/IESNA Standard 90.1-1999 for: (1) Three-phase heat pumps with capacities under 65 thousand Btu per hour, which ASHRAE did not address in formulating Standard 90.1-1999; (2) central air-source heat pumps with capacities between 65 thousand and 240 thousand Btu per

hour, which would be the subject of further analysis with respect to cooling as a result of the Screening Analysis and public comments; and (3) packaged terminal heat pumps, which also would be the subject of further analysis of their cooling performance.

DOE recognizes that ASHRAE did not evaluate the efficiency levels for oil-fired packaged boilers explicitly, and the published values in ASHRAE/IESNA Standard 90.1-1999 were tied to the corresponding efficiencies for gas-fired packaged boilers. Since DOE intends to evaluate gas-fired packaged boilers as a result of the Screening Analysis, we plan to wait for that evaluation to be complete before adopting efficiency standards for the equivalent oil-fired products. Finally, ASHRAE/IESNA Standard 90.1-1999 provides, in effect, that its boiler efficiency standards apply only to low

pressure boilers. In another rulemaking, DOE is addressing the question of whether EPCA efficiency requirements apply also to high pressure boilers. (See 65 FR 48838, 48843, Aug. 9, 2000). We intend to address in that proceeding the impact, if any, of ASHRAE/IESNA Standard 90.1-1999 on efficiency standards under EPCA for high pressure boilers.

In sum, today's rule adopts ASHRAE/IESNA Standard 90.1-1999 standard levels as uniform national standards for 18 product categories. These product categories appear in Table 5, along with the Department's intentions with respect to an additional 16 products, for which DOE is not adopting new efficiency levels at the present time. For the latter products, the levels prescribed in EPCA remain unaltered at present.

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Table 5. DOE Actions

Product Category	Action
Central Air Source AC 135 - 240 kBtu/h	Evaluate Further/Encourage ASHRAE/IESNA Addendum
Central Air Source HP 135 - 240 kBtu/h	
Central Air Source AC 65 - 135 kBtu/h	
Central Air Source HP 65 - 135 kBtu/h	
Central Water Cooled AC 135 - 240 kBtu/h	Adopt ASHRAE/IESNA Standard 90.1-1999
Central Water Source HP 135 - 240 kBtu/h	
Central Water Cooled AC 65 - 135 kBtu/h	
Central Water Source HP 65 - 135 kBtu/h	
Central Water Cooled AC <65 kBtu/h	
Central, Water Source HP 17 - 65 kBtu/h	
Central Water Source HP <17 kBtu/h	
Packaged Terminal Air Conditioners	Evaluate Further/Encourage ASHRAE/IESNA Addendum
Packaged Terminal Heat Pumps	
3-Phase Single Package Air Source AC <65 kBtu/h	Encourage ASHRAE/IESNA Addendum
3-Phase Split Air Source AC <65 kBtu/h	
3-Phase Single Package Air Source HP <65 kBtu/h	
3-Phase Split Air Source HP <65 kBtu/h	
Evaporatively Cooled AC Products	Adopt ASHRAE/IESNA Standard 90.1-1999
Gas-Fired Warm Air Furnaces \geq 225 kBtu/h	
Oil-Fired Warm Air Furnaces \geq 225 kBtu/h	
Large Gas-Fired Boilers >2.5 MMBtu/h	Evaluate Further/Encourage ASHRAE/IESNA Addendum
Large Oil-Fired Boilers >2.5 MMBtu/h	Evaluate Further (with Gas-Fired Boilers)
Small Gas-Fired Boilers 0.3 - 2.5 MMBtu/h	Evaluate Further/Encourage ASHRAE/IESNA Addendum
Small Oil-Fired Boilers, 0.3 - 2.5 MMBtu/h	Evaluate Further (with Gas-Fired Boilers)
Gas Storage Water Heaters >155 kBtu/h	Adopt ASHRAE/IESNA Standard 90.1-1999
Oil-Fired Storage Water Heaters >155 kBtu/h	
Gas Storage Water Heaters \leq 155 kBtu/h	
Oil-Fired Storage Water Heaters \leq 155 kBtu/h	
Tankless Gas-Fired Instantaneous Water Heaters	Evaluate Further/Encourage ASHRAE/IESNA Addendum
Tankless Oil-Fired Instantaneous Water Heaters	Adopt ASHRAE/IESNA Standard 90.1-1999
Gas-Fired Instantaneous Water Heaters with Tanks	
Oil-Fired Instantaneous Water Heaters with Tanks	
Unfired Hot Water Storage Tanks	
Electric Water Heaters	Reject ASHRAE/IESNA Standard 90.1-1999

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III. Procedural Requirements

A. Review Under the National Environmental Policy Act of 1969

EPCA prescribes energy efficiency standards for certain commercial products and stipulates that if ASHRAE/IESNA Standard 90.1 is amended, the Secretary must adopt new efficiency requirements in ASHRAE/IESNA Standard 90.1 for covered products, unless (s)he determines that certain conditions for requiring more stringent standards are met. Where these conditions are not met, the Secretary has no discretion to adopt a higher standard. In today's rule, we are adopting standards for a variety of commercial products included in ASHRAE/IESNA Standard 90.1-1999, as published in October of 1999, as uniform national standards. Under the terms of EPCA, these standards are at the lowest levels permitted by law.

We have reviewed today's rule under the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. 4321 *et seq.*, the regulations of the Council on Environmental Quality, 40 CFR parts 1500-1508, the Department's regulations for compliance with NEPA, 10 CFR Part 1021, and the Secretarial Policy on the National Environmental Policy Act (June 1994). Implementation of today's rule would not result in negative environmental impacts. We have therefore determined that today's rule is covered under the Categorical Exclusion found at paragraph A6 of appendix A to subpart D of the Department's NEPA Regulations, which applies to rulemakings that are strictly procedural. Accordingly, neither an environmental assessment nor an environmental impact statement is required.

B. Review Under Executive Order 12866, "Regulatory Planning and Review"

Today's rule has been determined not to be a "significant regulatory action," as defined in section 3(f) of Executive Order 12866, "Regulatory Planning and Review" 58 FR 51735 (October 4, 1993). Accordingly, this action was not subject to review under the Executive Order by the Office of Information and Regulatory Affairs.

C. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act of 1980, 5 U.S.C. 603, requires the preparation of an initial regulatory flexibility analysis for every rule which the agency must propose for public comment, by law, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small

entities. A regulatory flexibility analysis examines the impact of the rule on small entities and considers alternative ways of reducing negative impacts.

The Regulatory Flexibility Act does not apply in this case. First, today's rule need not have been proposed for comment. Second, even if the rule were required to be proposed for comment, no less stringent standard is permitted under the statute, so any impact on small business is due to EPCA and not to today's rule.

D. Review Under Executive Order 13132, "Federalism"

Executive Order 13132 (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 carefully assess the necessity for such actions. The rule published today will primarily codify energy efficiency standards at the minimum levels allowed by EPCA and will not regulate the states. We have determined that today's rule does 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. No further action is required by Executive Order 13132.

E. Review Under Executive Order 12630, "Governmental Actions and Interference with Constitutionally Protected Property Rights"

We have determined under Executive Order 12630, "Governmental Actions and Interference with Constitutionally Protected Property Rights," 52 FR 8859 (March 18, 1988), that this regulation would not result in any takings which might require compensation under the Fifth Amendment to the United States Constitution.

F. Review Under the Paperwork Reduction Act

Today's rule will codify energy efficiency standards for certain commercial products and will not require any additional reports or record-keeping. Accordingly, this action was not subject to review under the Paperwork Reduction Act.

G. Review Under Executive Order 12988, "Civil Justice Reform"

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 (February 7, 1996), imposes on executive agencies the general duty to adhere to the following requirements: (1) Eliminate drafting errors and ambiguity; (2) write regulations to minimize litigation; and (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 the Executive Order 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) provide 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 the Executive Order requires agencies to review regulations in light of applicable standards Section 3(a) and Section 3(b) to determine whether they are met or it is unreasonable to meet one or more of them.

We reviewed today's rule under the standards of Section 3 of the Executive Order and determined that, to the extent permitted by law, it meets the requirements of those standards.

H. 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, as amended by the Federal Energy Administration Authorization Act of 1977 (FEAA). 15 U.S.C. 788. Section 32(c) provides that the Secretary may not incorporate commercial standards within any rule nor prescribe any rule specifically authorizing or requiring commercial standards, unless (s)he has consulted with the Attorney General and the Chairman of the Federal Trade Commission concerning the impact of the standards on competition, and neither official recommends against incorporating or using them.

This rule incorporates efficiency levels specified by a commercial standard, ASHRAE/IESNA Standard 90.1-1999, for certain commercial products. However, since EPCA specifically directs the adoption of these

levels at a minimum, Section 32 of the FEAA does not apply to the incorporation of these commercial standards in today's rule.

I. Review Under Unfunded Mandates Reform Act of 1995

Section 202 of the Unfunded Mandates Reform Act of 1995 requires each Federal agency, unless otherwise prohibited by law, to assess the effects of Federal regulatory actions on state, local and tribal governments and the private sector (other than to the extent that such regulations incorporate requirements specifically set forth in law). 2 U.S.C. 1531. The statute also requires a written statement, before promulgating any general notice of proposed rulemaking or any final rule for which a general notice of proposed rulemaking was published, if the rule in question contains a mandate that may result in aggregate expenditures of over \$100,000,000 by state, local and tribal governments and the private sector. 2 U.S.C. 1532 (a).

In adopting the efficiency standards in today's rule, DOE is incorporating requirements specifically set forth in EPCA. Furthermore, no notice of proposed rulemaking was required, nor has one been published. Therefore, the requirements of Title II of the Unfunded Mandates Reform Act do not apply to this action.

J. Review Under the Plain Language Directives

The President's Memorandum, "Plain Language in Government Writing," 63 FR 31885 (June 10, 1998) directs each Federal agency to write all published rulemaking documents in plain language. The Memorandum includes general guidance on what constitutes "plain language." Plain language requirements will vary from one document to another, depending on the intended audience, but all plain language documents should be logically organized and clearly written.

We have written this final rule to be easy to understand by organizing it to suit the needs of stakeholders better, by avoiding unnecessary technical jargon, and by following Departmental instructions and guidelines related to plain language. We conclude that, to the extent practicable, the language of this final rule is consistent with the President's Memorandum on "Plain Language in Government Writing."

K. 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 or policy that may affect family well-being. Today's rule is not a proposed rule, nor will the rule have any impact on the autonomy or the integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

L. Review Under the Small Business and Regulatory Enforcement Fairness Act

Consistent with Subtitle E of the Small Business and Regulatory Enforcement Fairness Act of 1996, 5 U.S.C. 801-808, DOE will submit to Congress a report regarding the issuance of today's final rule before the effective date set forth at the outset of this notice. The report will state that it has been determined that this rule is not a "major rule" as defined by 5 U.S.C. 804 (2).

List of Subjects in 10 CFR Part 431

Administrative practice and procedure, Commercial and Industrial Equipment, Energy conservation,

Issued in Washington, DC, on January 4, 2001.

Dan J. Leiter,

Principal Deputy Assistant Secretary, Energy Efficiency and Renewable Energy.

For the reasons set forth in the preamble, Title 10, Part 431 of the Code of Federal Regulations is amended 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. 6311-6316.

2. Subpart Q is added to read as follows:

Subpart Q—Amended Energy Conservation Standards for Certain Commercial Equipment, and Effective Dates

Sec.

- 431.701 Purpose and scope.
- 431.702 Commercial warm air furnaces.
- 431.703 Small and large commercial package air conditioning and heating equipment.
- 431.704 Commercial water heaters and unfired hot water storage tanks.

Subpart Q—Amended Energy Conservation Standards for Certain Commercial Equipment, and Effective Dates

§ 431.701 Purpose and scope.

This subpart sets forth the minimum efficiency levels for commercial equipment, contained in ASHRAE/IES Standard 90.1-1999, that the Department of Energy has adopted as national standards, effective in 2003 or 2004 as specified in §§ 431.701 through 431.704. On their effective dates, these levels will amend and replace some of the efficiency levels required for certain commercial equipment by Section 342(a) of EPCA. The Department has not adopted the efficiency levels specified in ASHRAE/IES Standard 90.1-1999 for products not identified in this subpart, and the levels specified in Section 342(a) of EPCA for those products will remain in force unless and until they are amended. The Department adopted the efficiency levels in this subpart pursuant to Section 342(a)(6) of EPCA, which addresses the establishment of national standards at minimum levels specified in amendments to ASHRAE/IES Standard 90.1, in place of the efficiency levels required in Section 342(a) of EPCA.

§ 431.702 Commercial warm air furnaces.

Each commercial warm air furnace manufactured after October 29, 2003 must meet the following energy efficiency standard levels:

(a) For a gas-fired commercial warm air furnace with capacity of 225,000 Btu per hour or more, the thermal efficiency at the maximum rated capacity must be not less than 80 percent.

(b) For an oil-fired commercial warm air furnace with capacity of 225,000 Btu per hour or more, the thermal efficiency at the maximum rated capacity must be not less than 81 percent.

§ 431.703 Small and large commercial package air conditioning and heating equipment.

Each commercial water- or evaporatively-cooled air conditioner and water-source heat pump manufactured after October 29, 2003 (except for large commercial package air-conditioning and heating equipment, for which the effective date is October 29, 2004) must meet the applicable minimum energy efficiency standard level(s) for heating and cooling set forth in Tables 1 and 2 of this section.

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Table 1 - Minimum Cooling Efficiency Levels

Product	Category	Cooling capacity	Subcategory	Required Minimum Efficiency Level ¹	Effective Date
Small Commercial Packaged Air Conditioning and Heating Equipment	Water-Cooled, Evaporatively Cooled, and Water-Source	<17,000 Btu/h	Air Conditioners	EER: 12.1	10/29/2003
			Heat Pumps	EER: 11.2	10/29/2003
		≥ 17,000 Btu/h and <65,000 Btu/h	Air Conditioners	EER: 12.1	10/29/2003
			Heat Pumps	EER: 12.0	10/29/2003
			Air Conditioners	EER: 11.5 ²	10/29/2003
Large Commercial Packaged Air Conditioning and Heating Equipment	Water-Cooled, and Evaporatively Cooled	<135,000 Btu/h	Heat Pumps	EER: 12.0	10/29/2003
		≥ 135,000 Btu/h and <240,000 Btu/h	All	EER: 11.0	10/29/2004

Table 2 - Minimum Heating Efficiency Levels

Product	Category	Cooling Capacity	Subcategory	Required Minimum Efficiency Level ³	Effective Date
Small Commercial Packaged Air Conditioning and Heating Equipment	Water-Source	<135,000 Btu/h	All	COP: 4.2	10/29/2003

¹ All EER values must be rated at 95°F outdoor dry-bulb temperature for air-cooled products and evaporatively-cooled products and at 85°F entering water temperature for water-source and water-cooled products.

² Deduct 0.2 from the required EER for units with heating sections other than electric resistance heat.

³ All COP values must be rated at 70°F entering water temperature for water-source products.

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§431.704 Commercial water heaters and unfired hot water storage tanks.

Each commercial storage water heater, instantaneous water heater, and hot water supply boiler manufactured after October 29, 2003 must meet the applicable energy conservation standard level(s) as follows:

Equipment Type	Category	Size or Rating	Energy Efficiency Descriptor	Required Energy Efficiency Level ¹	Effective Date
Gas Storage Water Heaters	< 4,000 Btu/hr/gal	≤ 155,000 Btu/hr	Min. Thermal Efficiency	80%	10/29/2003
			Max. Standby Loss ²	$Q/800 + 110\sqrt{V_r}$ (Btu/hr)	10/29/2003
	> 4,000 Btu/hr/gal	> 155,000 Btu/hr	Min. Thermal Efficiency	80%	10/29/2003
			Max. Standby Loss ²	$Q/800 + 110\sqrt{V_r}$ (Btu/hr)	10/29/2003
Oil Storage Water Heaters	≥ 4,000 Btu/hr/gal	≥ 10 gal	Min. Thermal Efficiency	80%	10/29/2003
			Max. Standby Loss ²	$Q/800 + 110\sqrt{V_r}$ (Btu/hr)	10/29/2003
	< 4,000 Btu/hr/gal	≤ 155,000 Btu/hr	Min. Thermal Efficiency	78%	10/29/2003
			Max. Standby Loss ²	$Q/800 + 110\sqrt{V_r}$ (Btu/hr)	10/29/2003
Oil Instantaneous Water Heaters	≥ 4,000 Btu/hr/gal	< 10 gal	Min. Thermal Efficiency	80%	10/29/2003
			Max. Standby Loss ²	$Q/800 + 110\sqrt{V_r}$ (Btu/hr)	10/29/2003
	≥ 4,000 Btu/hr/gal	≥ 10 gal	Min. Thermal Efficiency	78%	10/29/2003
			Max. Standby Loss ²	$Q/800 + 110\sqrt{V_r}$ (Btu/hr)	10/29/2003
Unfired Hot Water Storage Tanks	All	All	Minimum Insulation Requirement	R-12.5	10/29/2003

¹ Standby loss is based on a 70° temperature difference between stored water and ambient requirements. In the Standby Loss equations, V_r is the rated volume in gallons, and Q is the nameplate input rate in Btu/h.

² Water heaters and hot water supply boilers having more than 140 gallons of storage capacity are not required meet the standby loss requirement if the tank surface is thermally insulated to R-12.5, if a standing pilot light is not installed, and gas- or oil-fired storage water heaters have a flue damper or fan-assisted combustion.