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## DEPARTMENT OF ENERGY

[Docket No. EERE-2006-BC-0132]

RIN 1904-AC18

### Building Energy Standards Program: Preliminary Determination Regarding Energy Efficiency Improvements in the Energy Standard for Buildings, Except Low-Rise Residential Buildings, ANSI/ASHRAE/IESNA Standard 90.1-2007

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

**ACTION:** Notice of preliminary determination.

**SUMMARY:** The Department of Energy (DOE) has preliminarily determined that the 2007 edition of the *Energy Standard for Buildings, Except Low-Rise Residential Buildings*, American National Standards Institute (ANSI)/ American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Illuminating Engineering Society of North America (IESNA) Standard 90.1-2007, (Standard 90.1-2007) would achieve greater energy efficiency in buildings subject to the code, than the 2004 edition (Standard 90.1-2004 or the 2004 edition). Also, DOE has preliminarily determined that the quantitative analysis of the energy consumption of buildings built to Standard 90.1-2007, as compared with buildings built to Standard 90.1-2004, indicates national source energy savings of approximately 3.7 percent of commercial building energy consumption. Additionally, DOE has preliminarily determined site energy savings are estimated to be approximately 4.4 percent. If these determinations are finalized, States would be required to certify that they have reviewed the provisions of their commercial building code regarding energy efficiency, and as necessary, updated their code to meet or exceed Standard 90.1-2007. Additionally, this Notice provides guidance to States on Certifications, and Requests for Extensions of Deadlines for Certification

Statements, should the preliminary determination be adopted as final.

**DATES:** Comments on the preliminary determination must be provided by October 4, 2010.

**ADDRESSES:** You may submit comments, identified by any of the following methods:

- *Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the instructions for submitting comments.

- *E-mail:* [ronald.majette@ee.doe.gov](mailto:ronald.majette@ee.doe.gov). Include RIN 1904-AC18 in the subject line of the message.

- *Postal Mail:* Mr. Ronald B. Majette, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Forrestal Building, Mail Station EE-2J, 1000 Independence Avenue, SW., Washington, DC 20585-0121, Please submit one signed paper original.

- *Hand Delivery/Courier:* Mr. Ronald B. Majette, U.S. Department of Energy, Building Technologies Program, Room 6003, 1000 Independence Avenue, SW., Washington, DC 20585-0121.

*Instructions:* All submissions must include the agency name, Department of Energy, and docket number, EERE-2006-BC-0132, or Regulatory Information Number (RIN), 1904-AC18, for this rulemaking.

**FOR FURTHER INFORMATION CONTACT:** Mr. Ronald B. Majette, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Forrestal Building, Mail Station EE-2J, 1000 Independence Avenue, SW., Washington, DC 20585-0121, 202-586-7935. For legal issues contact Kavita Patel, U.S. Department of Energy, Office of the General Counsel, Forrestal Building, GC-71, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586-0669, e-mail: [Kavita.Patel@hq.doe.gov](mailto:Kavita.Patel@hq.doe.gov).

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## I. Introduction

### A. Statutory Requirements

Title III of the Energy Conservation and Production Act, as amended (ECPA), establishes requirements for the Building Energy Efficiency Standards Program. (42 U.S.C. 6831 *et seq.*) Section 304(b), as amended, of ECPA provides that whenever the ANSI/ASHRAE/IESNA Standard 90.1-1989 (Standard 90.1-1989 or 1989 edition), or any successor to that code, is revised, the Secretary must make a determination, not later than 12 months after such revision, whether the revised code would improve energy efficiency in commercial buildings and must publish notice of such determination in the **Federal Register**. (42 U.S.C. 6833 (b)(2)(A)) The Secretary may determine that the revision of Standard 90.1-1989 or any successor thereof, improves the level of energy efficiency in commercial buildings. If so, then not later than two years after the date of the publication of such affirmative determination, each State is required to certify that it has reviewed and updated the provisions of its commercial building code regarding energy efficiency with respect to the revised or successor code. (42 U.S.C. 6833(b)(2)(B)(i)) The State must include in its certification a demonstration that the provisions of its commercial building code, regarding energy efficiency, meet or exceed the revised standard. (42 U.S.C. 6833(b)(2)(B)(ii))

If the Secretary makes a determination that the revised standard will not improve energy efficiency in commercial buildings, State commercial codes shall meet or exceed the last revised standard for which the Secretary has made a positive determination. (42 U.S.C. 6833(b)(2)(B)(ii)). On December 30, 2008, the Secretary published a determination in the **Federal Register** updating the reference code to Standard 90.1-2004. 73 FR 79868.

ECPA also requires the Secretary to permit extensions of the deadlines for the State certification if a State can demonstrate that it has made a good faith effort to comply with the requirements of Section 304(c) of ECPA and that it has made significant progress in doing so. (42 U.S.C. 6833(c))

## B. Background

### 1. Publication of Standard 90.1–2007

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and the Illuminating Engineering Society of North America (IESNA) approved the publication of the 2007 edition of *Energy Standard for Buildings Except Low-rise Residential Buildings*, in December 2007.

The Standard was developed under American National Standards Institute approved consensus standard procedures. Standard 90.1 is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the ASHRAE Standard Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. The American National Standards Institute (ANSI) approves addenda prior to their publication by ASHRAE and IESNA and therefore prior to their inclusion in a new version of Standard 90.1. ANSI approved the final addendum for inclusion in Standard 90.1–2007 on December 18, 2007. The 2007 edition was published in December 2007.

### 2. Analysis Methodology

In arriving at a preliminary determination, the DOE first reviewed all significant changes between the 2004 edition and the 2007 edition of Standard 90.1. Standard 90.1 is complex and covers a broad spectrum of the energy related components and systems in buildings ranging from simple storage buildings to complex hospitals and laboratories. The size of buildings addressed range from those smaller than single family homes to the largest buildings in the world. The approach to development of the standard used in the 2007 edition was not changed from that used for the 2004 edition, with no changes to the scope or the way components are defined. We preliminarily determined that because no significant changes were made to the structure, scope, or component definitions of Standard 90.1–2004, a similar methodology used for the analysis of Standard 90.1–2004 could be utilized for the analysis of Standard 90.1–2007, consisting of a qualitative comparison of the textual changes to requirements in Standard 90.1–2007 from Standard 90.1–2004, and a quantitative estimate of the energy savings developed from whole building simulations of a standard set of

buildings constructed to both Standards over a range of U.S. climates. DOE chose to modify several details of how the quantitative analysis would be done, including changes in the simulation tool used, the building models, and the procedure and data for weighting of results by building type and climate. DOE held a public workshop on February 18, 2009 to provide for public comment on the proposed analysis methodology. DOE provided notice of the workshop in the **Federal Register** (74 FR 4169; Jan. 23, 2009) in which it outlined changes in the methodology from previous determinations and identified ten key issues for which it requested stakeholder input. These issues were:

(1) Specific reductions in stringency in Standard 90.1–2007 that DOE should be made aware of and that have been identified by stakeholders.

(2) Specific changes in scope between Standard 90.1–2004 and Standard 90.1–2007 and how DOE should interpret expansions of scope in its determination.

(3) DOE's proposed approach to changes in referenced ventilation standards between Standard 90.1–2004 and Standard 90.1–2007.

(4) DOE's proposed approach for addressing future effective dates for mechanical equipment requirements.

(5) The frequency of use of alternative paths to compliance in building standards (*e.g.* space-by-space versus whole building lighting power allowances).

(6) New non-residential building construction data (including Mid-rise and High-rise residential) by State or census division and building type.

(7) Data to quantify the impact of Standard 90.1 on additions and renovations to existing buildings.

(8) The relative prevalence of the semi-heated building envelope subcategory in the building types proposed for analysis (*e.g.* warehouses).

(9) The relative importance of the Mid- and High-rise residential sector in DOE's determination and data for developing weighting factors for this sector.

(10) Data describing the relative frequency of use of alternative paths to compliance.

DOE only received stakeholder input peripherally related to one of these key issues, that of the relative importance of mid- to high-rise residential building and their construction. However, DOE received input on several other issues of concern to stakeholders.

### 3. DOE Response to Comments on Previous Analysis

DOE sought comment on its general approach to the preliminary determination analysis and during the public meeting outlined the proposed approach and responded to questions and to comments received. DOE reviewed the comments and data submitted regarding issues raised in the proposed methodology for the quantitative analysis. The more significant comments are discussed below. DOE received comments in four general areas regarding the determination analysis methodology: The treatment of equipment efficiency improvements, characteristics of multi-family buildings, climates used in the quantitative analysis, and how DOE addresses the cost-effectiveness of requirements. DOE received other comments relating to how the determination results were to be used.

DOE's proposed quantitative analysis methodology includes any equipment efficiency improvements mandated by Federal equipment efficiency standards, either established by DOE or by legislation but not initiated by addenda to ASHRAE 90.1–2004, in the ASHRAE 90.1–2004 baseline. The purpose for this is to prevent inclusion in the quantitative analysis of energy savings that would occur in new building construction (due to these mandated equipment efficiency improvements) regardless of the use of Standard 90.1–2004 or Standard 90.1–2007 as the basis for State building codes. This is consistent with the approach used in previous DOE determinations.

The National Multi Housing Council (NMHC) commented that DOE's approach would seem to miss an important energy savings feature and that the published standard does have a list of equipment efficiencies that should be the base for the calculations. NMHC commented that taking this into account would seem to be more important given the emphasis to improve the efficiency of the standard by a certain percentage. Also, NMHC commented that there is a time lag between when equipment improvements are adopted by the standards and when DOE publishes these as requirements. (NMHC, Public Meeting Transcript, pp. 38, 40–41)

DOE does not use the determination methodology to ascertain whether the standard has met a minimum percentage improvement and is instead focused on estimating whether the adoption of the revised standard as the basis of State building codes would result in energy savings, as compared to the previous

version. With regard to the last statement, DOE's quantitative analysis methodology does include energy savings from improvements in equipment efficiency first initiated by ASHRAE 90.1 in part because these improvements can be requirements in building codes before they can be promulgated as Federal minimum equipment efficiency standards. After considering the statements of NMHC, DOE determined not to modify its proposed methodology.

The Responsible Energy Codes Alliance (RECA) wanted clarification and assurance that DOE was not providing credit in the assessment of energy savings for any requirements in 90.1 that would in fact be preempted by existing Federal equipment efficiency standards and therefore could not be promulgated in State codes. (RECA, Public Meeting Transcript, pp. 43–45) DOE notes that there are no such requirements in ASHRAE Standard 90.1–2007 and that this concern does not exist for this preliminary determination.

In its discussion on the number of climates, NMHC asked if DOE planned to reduce the number of simulation locations from those identified in the notice and encouraged DOE not to reduce the number of locations used for the quantitative analysis simulations. (NMHC, Public Meeting Transcript, p. 57) In response, DOE will use a single representative climate for each of the 15 U.S. climate zones identified in the ASHRAE Standard 90.1–2004 and ASHRAE Standard 90.1–2007 documents. It did not reduce the number of climate zones being used in the quantitative analysis but rather increased this number when compared with previous determinations.

In commenting on representativeness of the multi-family building models, the NMHC commented that wood-frame was the dominant construction type up to and including four stories. NMHC stated that above five stories, steel-frame construction is more common, but the percentage of the construction market represented by these taller buildings drops off considerably. NMHC suggested that for the mid-rise multi-family buildings, DOE could assume that wood-frame construction was representative of the market. NMHC noted a steel-frame building would be more representative of a high-rise construction (10 stories) and DOE could assume steel-frame for the high-rise multi-family building class. (NMHC, Public Meeting Transcript, p. 65) The American Forest & Paper Association (AF&PA) expressed concern that the quantitative analysis would not pick up

on the fact that multi-family buildings are built out of wood-frame construction. (AF&PA, Public Meeting Transcript, p. 73) In response, DOE appreciates the information provided by the NMHC and points out that wood-frame construction does form the basis of the mid-rise apartment building model. DOE has not included a high-rise apartment building model into its quantitative analysis for the Standard 90.1–2007 determination.

AF&PA expressed concern over how the results of a quantitative analysis are used by DOE and presented to the building community. In particular, AF&PA questioned why a quantitative analysis is being done by DOE, given the legislative charge to DOE regarding the determination. AF&PA stated that it appeared that doing a quantitative analysis may be going beyond what is required of DOE. Further, AF&PA stated that DOE believes that this comparison can be done with a qualitative analysis, but DOE is choosing to bring in a quantitative analysis that misses some very significant issues such as construction type and material choices. They stated that it seems that the DOE goal for 30 percent savings applies only to Federal buildings and questioned why DOE isn't looking at a typical pool of Federal buildings if it wants to do a quantitative analysis toward that goal. Finally, AF&PA stated that the results of a quantitative analysis would be a driving factor with the 90.1 committee, and that this would put further pressure on the committee to increase the stringency of wood-frame construction. (AF&PA, Public Meeting Transcript, pp. 69–74)

In response, DOE notes that the preliminary determination on ASHRAE Standard 90.1–2007 is not related to the legislative goal of 30-percent improvement in Federal buildings. In addition, while DOE has signed a memorandum with ASHRAE to improve energy efficiency in commercial building codes (Memorandum of Understanding between the United States Department of Energy and the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. Signed July 2007), DOE does not consider the purpose of the preliminary determination to measure how far along a path building standards have progressed from ASHRAE Standard 90.1–2004. DOE does believe that a quantitative analysis of savings should be done alongside a qualitative analysis and has carried this through in past ASHRAE Standard 90.1 determinations. The quantitative analysis allows DOE to examine quantitatively multiple changes to

Standard 90.1, with some reflecting improved efficiency, and others possibly reduced efficiency to determine in balance whether there has been an overall improvement in building efficiency. DOE does not intend for this preliminary determination to be used as a tool to measure progress toward a 30-percent improvement in commercial building energy codes beyond ASHRAE Standard 90.1–2004. In support of both the preliminary determination and ASHRAE-driven code improvement process, DOE and ASHRAE are relying on a sample set of commercial buildings (based on the DOE benchmark buildings developed for DOE's Net-Zero Energy Commercial Buildings Initiative and available at [http://www1.eere.energy.gov/buildings/commercial\\_initiative/benchmark\\_models.html](http://www1.eere.energy.gov/buildings/commercial_initiative/benchmark_models.html)) for measuring improvement in commercial building efficiency. DOE is using versions of this same set of building models for both the preliminary determination quantitative analysis as well as in a separate project to track improvement in future updates to ASHRAE Standard 90.1. The versions used for this preliminary determination can be found at [http://www.energycodes.gov/implement/determinations\\_90.1-2007.stm](http://www.energycodes.gov/implement/determinations_90.1-2007.stm).

Following up on AF&PA comments, ASHRAE commented that the Standard 90.1 development process is done with consensus building following the ANSI process and is developed through a broad spectrum of representation. ASHRAE further commented that the 30-percent target that was reflected in a memorandum with DOE to improve efficiency in commercial buildings is a goal, not a mandate, since a mandate cannot be placed on a consensus body. (ASHRAE, Public Meeting Transcript, pp. 81, 82)

AF&PA also commented that the DOE analysis reflects a snapshot in time and does not consider changes that will occur in the marketplace. Further, AF&PA believed that there is a legislative charge for DOE to support the notion of cost-effectiveness and use of readily available technology. They asked if there is a way for DOE to become more engaged in how that aspect is driving changes in envelope energy performance. (AF&PA, Public Meeting Transcript, pp. 87–88) In response, DOE points out that the analysis used to set the envelope requirements for different construction assemblies had cost-effectiveness as its basis. However, the purpose of the preliminary determination analysis is not to investigate the validity of the development of ASHRAE Standard

90.1–2007 but to determine whether it reflects an increase in efficiency.

AF&PA also asked if a description of the building models, in particular how infiltration is modeled, could be provided. (AF&PA, Public Meeting Transcript, pp. 93–94) DOE has included a description of the benchmark building models and how these were used in the quantitative analysis documentation published at [http://www.energycodes.gov/implement/determinations\\_90.1-2007.stm](http://www.energycodes.gov/implement/determinations_90.1-2007.stm).

RECA commented that some States that will adopt the International Energy Conservation Code (IECC) for both residential and commercial building energy codes with the understanding that because ASHRAE is referenced by the IECC, they are essentially equivalent. RECA asked whether DOE has prepared any guidance for States to describe what is acceptable and whether this would be provided in the preliminary determination. (RECA, Public Meeting Transcript, pp. 111–112)

Currently, DOE has not published any statements that a version of the IECC is equivalent in terms of energy savings to for ASHRAE 90.1 in the State code certification process. Each State's submittal with regard to certification of its energy code is dealt with on a case-by-case basis. Further, the DOE commercial energy code certification requirements with regard to meeting or exceeding the efficiency of the most recent ASHRAE Standard 90.1 version for which a positive determination has been made are separate from the residential energy code certification requirements that reference the IECC. Some States may adopt the IECC and not adopt the commercial code requirements. For these reasons, DOE considers the commercial and residential building energy code certification by the States a separate process.

As acknowledged in the previous analysis, DOE recognizes that, given the numerous assumptions required to simulate the potential impact of a new commercial building energy standard, reasonable minds could differ over both the specific building models employed and the assumptions used in those models. DOE also recognizes the cautions from AF&PA regarding the quantitative analysis and previous comments about the complexity of the problem.

DOE recognizes that the methodology proposed for the quantitative analysis will be insufficient for determining an absolute quantification of energy savings estimates associated with using Standard 90.1–2007 (e.g., total quads of energy savings) and makes no such

claim for the analysis on which this preliminary determination relies. DOE's quantitative analysis includes many of the changes brought about in Standard 90.1–2007 that can be modeled, but this quantitative analysis is not able to quantify accurately all the likely effects of the new standard. In particular, the degree to which the market may react to certain changes brought about following the adoption of a new building code, and the degree to which different requirements are currently being met or will be met in future construction, are exceedingly difficult to ascertain and would affect the absolute quantification of energy savings. However, DOE believes that the quantitative determination process outlined does provide a reasonable approach to establishing whether, in concert, the changes brought about by ASHRAE Standard 90.1–2007 will result in improved energy efficiency in buildings over ASHRAE Standard 90.1–2004.

DOE continues to believe that the preliminary determination should rely on both quantitative and qualitative comparisons. While quantitative estimates of energy savings are indeed a much preferred method of comparison, it is not always possible to simulate or provide appropriate weighting to many features in Standard 90.1. Therefore, DOE will continue to note changes that individually or in net result in increased energy efficiency, even where they could not be accurately quantified. States can use this information when upgrading their energy codes.

DOE continues to believe that the quantitative analysis should be based on the minimum requirements of each standard that reflect the minimum set of options available in new construction. In assessing the impact of those requirements, DOE also believes that assessment should be based on an estimate of typical construction practices. DOE believes that this has been done in the quantitative analysis.

For this preliminary determination, DOE utilized 5 years of previous building construction data, as developed using proprietary F.W. Dodge building statistical data by building type and by location down to the county level and purchased by DOE, to develop weighting factors to weight the building simulation results. (A summary of the data is available in a PNNL report—PNNL–19116—Jarnagin and Bandyopodhyay, 2010, Weighting Factors for the Commercial Building Prototypes used in the Development of ANSI/ASHRAE/IESNA Standard 90.1–2010 at [http://www.pnl.gov/main/publications/external/technical\\_reports/PNNL-19116.pdf](http://www.pnl.gov/main/publications/external/technical_reports/PNNL-19116.pdf).) Past determinations

have relied on new construction floor space growth estimates extracted from the Energy Information Administration's (EIA) National Energy Modeling System (NEMS) as the basis for weighting energy savings across building types and regions. DOE believes that for the purpose of this analysis the F.W. Dodge construction data provides better mapping of actual construction by region and building type than could be obtained using the EIA/NEMS data. In particular, the use of county-level construction data allowed DOE to develop building construction statistics directly reflecting construction in each of the ASHRAE climate regions, avoiding many assumptions on regional construction volume that would be necessary using the EIA/NEMS data.

Consistent with the previous analysis, DOE compared versions of Standard 90.1 “as a whole” and did not issue determinations for individual addenda. DOE interprets the language in Section 304(b)(2) of ECPA to mean that when a comprehensive revision of the ASHRAE Standard is published (which in this case is ASHRAE Standard 90.1–2007), then that revised or successor standard triggers the Secretary's obligation to issue a determination as to whether the revised standard improves energy efficiency. This determination is made by comparing the revised or successor standard to the last predecessor standard. While the addenda process is part of the ongoing maintenance of the standard and thus continually modifies or revises the existing standard over time, it would be an unreasonable reading of the statute to categorize each addenda in this maintenance process as a “revised or successor standard” within the meaning of Section 304(b)(2) of ECPA, so as to require a determination by the Secretary. Such an interpretation of the statute would put an unreasonable burden both on the States and DOE. For the States, a determination by the Secretary requires some State action, and what is required depends upon whether the Secretary issues an affirmative or a negative determination. If the Secretary were required to issue a determination after each addenda was published, the States would be constantly required to change their codes. This would affect the stability and certainty of State commercial building codes.

The statutory language in Section 304(b) of ECPA states that the Secretary is required to make a determination as to whether any successor standard to ASHRAE Standard 90.1–1989 will improve energy efficiency. (42 U.S.C. 6833(b)(2)(A)) The Secretary must publish a notice of this determination in

the **Federal Register**. The language does not require that DOE perform an independent economic analysis as part of the determination process. Section 304(b) of ECPA does not include any reference to language concerning economic justification.

However, Congress did address consideration of the technological feasibility and cost effectiveness of the Voluntary Building Energy Codes. Section 307 of ECPA requires DOE to participate in the ASHRAE process and to assist in determining the cost effectiveness and technical feasibility of the ASHRAE standard. (42 U.S.C. 6836) It also requires DOE to periodically review the economic basis of the voluntary building energy codes and participate in the industry process for review and modification, including seeking adoption of all technologically feasible and economically justified energy efficiency measures. (42 U.S.C. 6836(b))

Unlike Section 307 of ECPA (42 U.S.C. 6836), which specifically includes language concerning economic justification, Section 304 of ECPA does not include any reference to economic justification. "It is generally presumed that Congress acts intentionally and purposefully where it includes particular language in one section of a statute but omits it in another section." *Bates v. United States*, 522 U.S. 23, 29–30 (1997) (Citations omitted). Accordingly, the statutory scheme cannot be read to require an economic analysis as part of the determination process in Section 304(b) of ECPA.

The fact that the Section 304 of ECPA determination process does not require the Secretary to perform an economic analysis does not diminish the importance that the ASHRAE standards be technologically feasible and economically justified. However, the statute addresses these issues by directing DOE to participate in the ASHRAE process itself.

Accordingly, for all of these reasons, DOE has determined that it is not required to perform an economic

analysis as part of its determination process in Section 304 of ECPA.

A significant change in DOE's approach from previous determinations was the use of specific buildings, as representative of a typical building type, in the development of building energy use intensity (EUI), without the scaling approach used in previous determinations. While the scaling approach used previously provides an assessment of the impact of building changes over a broad range of building sizes, DOE determined that the benefits did not outweigh the complexity of this approach for the purpose of a yes/no determination. The availability of commercial benchmark building models in EnergyPlus for a wide variety of building types and typical sizes was deemed sufficient for the preliminary quantitative determination analysis of Standard 90.1–2007.

One of the most significant commercial building end-uses regulated by energy codes and standards is lighting. For the preliminary quantitative analysis, each of DOE's building models have its internal lighting power density (LPD) determined using either the building area lighting compliance path or the space-by-space lighting compliance path from each ASHRAE Standard 90.1 edition. Building area LPDs are defined in ASHRAE Standard 90.1 as maximum lighting power allowance given in watts (W)/square foot (ft<sup>2</sup>), for specific building types and do not consider internal variation in the spaces used within a given building. In contrast, space-by-space LPDs are a specific lighting power allowance in W/ft<sup>2</sup> for a given space type regardless of what building type it is in. Using the space-by-space method, the maximum allowed lighting power density for a given building is determined by summing up the product of the area fraction of each defined space-type within the building and the allowed lighting power within each space-type. The space-by-space method takes into account variation in the area devoted to different space types

within a particular building. In addition, both Standard 90.1 editions allow for certain additional lighting power allowances when the space-by-space method is used.

The building models used for the preliminary quantitative analysis are specific building designs, in most cases with specific spaces defined within the prototype and with different lighting schedules for each space in accordance with its expected use. DOE chose to use the space-by-space method to establish the overall lighting power within these prototypes. In the case of one prototype, the strip mall retail building, DOE also included lighting power to reflect the typical values for additional lighting power allowances that would be allowed as display lighting under Standard 90.1–2004 and Standard 90.1–2007, assuming the same display area in the prototype. For building prototypes where space type distinctions were not deemed as important or significant, the building area LPD numbers were used (e.g., office buildings).

The use of the space-by-space lighting method is a deviation from previous ASHRAE Standard 90.1 determinations where less detailed building models were utilized in the quantitative analysis. However, since the base LPD values for either path did not change between Standard 90.1–2004 and Standard 90.1–2007 and the change in the additional lighting power allowance was small and considered for only one building type, the choice of compliance path was deemed not to affect significantly the determination of energy savings. For each building type, Table 1 shows the lighting compliance path used for the quantitative analysis and the average LPD used in the building models. Once selected, the same compliance path was used for LPD assumptions in both Standard 90.1 editions being compared. For each building prototype, the ASHRAE Standard 90.1–2004 and 90.1–2007 building area LPDs are shown for comparison alongside the values used in the quantitative analysis.

TABLE 1—INTERNAL LIGHTING POWER DENSITY USED IN BUILDING MODELS

Building type	Building prototype	Lighting compliance path used for simulation model	Simulation lighting power density W/ft <sup>2</sup>		Building area lighting power density W/ft <sup>2</sup>	
			90.1–2004	90.1–2007	90.1–2004	90.1–2007
Office .....	Small Office .....	Building Area .....	1.000	1.000	1.0	1.0
	Medium Office .....	Building Area .....	1.000	1.000	1.0	1.0
	Large Office .....	Building Area .....	1.000	1.000	1.0	1.0
Retail .....	Stand-Alone Retail .....	Space-by-Space .....	1.548	1.548	1.5	1.5
	Strip Mall .....	Space-by-Space .....	1.645	1.568	1.5	1.5
Education .....	Primary School .....	Space-by-Space .....	1.188	1.188	1.2	1.2
	Secondary School .....	Space-by-Space .....	1.134	1.134	1.2	1.2
Healthcare .....	Outpatient Health Care .....	Space-by-Space .....	1.094	1.094	1.0	1.0

TABLE 1—INTERNAL LIGHTING POWER DENSITY USED IN BUILDING MODELS—Continued

Building type	Building prototype	Lighting compliance path used for simulation model	Simulation lighting power density W/ft <sup>2</sup>		Building area lighting power density W/ft <sup>2</sup>	
			90.1–2004	90.1–2007	90.1–2004	90.1–2007
Lodging	Hospital	Space-by-Space	1.119	1.119	1.2	1.2
	Small Hotel	Space-by-Space	0.968	0.968	1.0	1.0
	Large Hotel	Building Area	1.000	1.000	1.0	1.0
Warehouse	Non-Refrigerated Warehouse	Space-by-Space	0.810	0.810	0.8	0.8
Food Service	Fast Food Restaurant	Space-by-Space	1.650	1.650	1.4	1.4
	Sit-Down Restaurant	Space-by-Space	1.855	1.855	1.6	1.6
Apartment	Mid-Rise Apartment	Space-by-Space	0.402	0.402	0.7	0.7

The building area LPDs are identical for both Standard 90.1 versions. The space-by-space LPDs tabulated by space type are also identical in both Standards. However, in addition, under the space-by-space compliance path are additional lighting power allowances provided for specific circumstances (primarily display lighting). Standard 90.1–2004 and Standard 90.1–2007 both have additional lighting power allowances for decorative lighting and for retail display lighting to highlight merchandise. Standard 90.1–2004 also provides a small additional lighting power allowance for video display terminal lighting. This latter was removed in Standard 90.1–2007 and considered seldom used in practice. The additional lighting power for decorative lighting was not changed between standards. The additional lighting power allowance for retail display lighting was changed to use four specific merchandise categories described by lists of merchandise. Only two general merchandise categories were used in Standard 90.1–2004. DOE collected limited information on display areas in a small sample of retail buildings and made a conservative estimate that for the strip mall prototype, approximately 13 percent of the entire building area might qualify for the display lighting power allowances. DOE assumed that the additional lighting power allowance for that display area was reduced from an average of 2.75 W/ft<sup>2</sup> (based on an average of the two additional lighting power display categories in Standard 90.1–2004) to 2.15 W/ft<sup>2</sup> (based on an average of the middle two additional lighting power display categories in

Standard 90.1–2007). This assumption resulted in a 4.6 percent reduction in whole building LPD for this prototype. DOE believes that this result is likely a conservative estimate of the energy savings from this additional lighting power change.

The final space-by-space calculations used in the quantitative analysis yield LPDs that differ from the LPDs determined from the building area compliance paths. For all building models other than restaurants and the mid-rise apartment, the lighting power densities used are between 7 percent lower to 8 percent higher than LPD from the building area compliance path. The LPDs modeled for the two restaurant prototypes are 16 to 18 percent higher than the LPD from the building area compliance path in either standard, a direct result of the relative ratio of kitchen to dining areas used in these prototypes compared with that assumed in the development of the ASHRAE 90.1 building area LPD values. All else being equal, the impact of higher LPD assumptions is to result in a somewhat greater cooling load and lower heating load in these prototypes.

The building average LPD modeled for the mid-rise apartment prototype is 43 percent lower than the tabulated building area LPD value shown in both versions of Standard 90.1. However, the lighting section in both versions states that lighting in living units (*i.e.*, apartments within multi-family housing) is not within the scope of Standard 90.1, implying that the building area method value should be applied only to common space within multi-family buildings and would not be suitable for the modeling of building

lighting power. To generate the LPD for the mid-rise apartment building, DOE used the space-by-space LPD allowances in Standard 90.1. The mid-rise apartment prototype consists of two defined space types: Office-enclosed and corridors; and the individual apartment units. Standard 90.1 has space-by-space LPDs for the office and corridor spaces. DOE assumed a value of 0.36 W/ft<sup>2</sup> for the LPD inside the apartments based on the lighting power assumptions found in the DOE Residential Building America Research Benchmark.

Identical lighting schedules were used for the Standard 90.1–2004 and Standard 90.1–2007 building prototypes, as no addenda to Standard 90.1–2004 affected the scheduled usage.

In addition to the internal lighting power density, Standard 90.1 has requirements for exterior lighting power. These requirements are identical between Standard 90.1–2004 and Standard 90.1–2007 and are based on the application of specific exterior lighting power densities allowances to defined exterior surfaces types (*e.g.*, building entrances or parking areas). In order for the building prototypes to better reflect energy use in actual buildings, specific assumptions for the amount of these defined exterior surfaces present for each building prototype were developed from detailed building plan data. All exterior lighting was assumed to be controlled by astronomical time clock for the prototypes.

Table 2 shows the exterior lighting power assumption, expressed in W/ft<sup>2</sup> of building area.

TABLE 2—EXTERIOR LIGHTING POWER FOR BOTH 90.1–2004 AND 90.1–2007 BUILDING PROTOTYPES

Building type	Building prototype	Prototype floor area ft <sup>2</sup>	Prototype exterior lighting power (normalized to W/ft <sup>2</sup> of building floor area)			
			Parking lot	Doors	Façade	Total
Office	Small Office	5,502	0.243	0.039	0.015	0.297
	Medium Office	53,628	0.243	0.010	0.015	0.268
	Large Office	498,588	0.098	0.002	0.026	0.126

TABLE 2—EXTERIOR LIGHTING POWER FOR BOTH 90.1–2004 AND 90.1–2007 BUILDING PROTOTYPES—Continued

Building type	Building prototype	Prototype floor area ft <sup>2</sup>	Prototype exterior lighting power (normalized to W/ft <sup>2</sup> of building floor area)			
			Parking lot	Doors	Façade	Total
Retail .....	Stand-Alone Retail .....	24,692	0.213	0.063	0.020	0.297
	Strip Mall .....	22,500	0.282	0.095	0.030	0.407
Education .....	Primary School .....	73,959	0.030	0.039	0.004	0.073
	Secondary School .....	210,887	0.042	0.021	0.003	0.067
Healthcare .....	Outpatient Health Care .....	40,946	0.304	0.042	0.007	0.353
	Hospital .....	241,501	0.048	0.007	0.014	0.069
Lodging .....	Small Hotel .....	43,202	0.117	0.006	0.018	0.140
	Large Hotel .....	122,120	0.109	0.004	0.047	0.159
Warehouse .....	Non-Refrigerated Warehouse .....	52,045	0.058	0.090	0.003	0.151
Food Service .....	Fast Food Restaurant .....	2,501	0.607	0.024	0.065	0.697
	Sit-Down Restaurant .....	5,502	0.607	0.027	0.037	0.672
Apartment .....	Mid-Rise Apartment .....	33,741	0.127	0.000	0.011	0.138

Because the exterior lighting power densities did not change between Standard 90.1–2004 and Standard 90.1–2007, the inclusion of exterior lighting does not affect DOE's determination of energy savings; however, as it affects the baseline building energy use, it does have an impact on the percentage savings calculated for each building type.

DOE's preliminary quantitative determination was carried out using the EnergyPlus building simulation tool. EnergyPlus was selected for this determination for several reasons. First, DOE believes that the underlying calculation methods and the wide variety of systems available in EnergyPlus version 3.0, used for this preliminary determination, are sufficiently advanced over those in BLAST and DOE2 to justify the use of EnergyPlus. Quoting from DOE's EnergyPlus Web site (<http://apps1.eere.energy.gov/buildings/energyplus/>), "While originally based on the most popular features and capabilities of BLAST and DOE-2, EnergyPlus includes many innovative simulation capabilities such as time steps of less than an hour, modular systems and plant integrated with heat balance-based zone simulation, multi-zone air flow, thermal comfort, water use, natural ventilation, and photovoltaic systems". Second, DOE had developed a set of commercial building prototypes in EnergyPlus that could reasonably form the basis of a national-scale simulation analysis. DOE has received and responded to much feedback from the ASHRAE Standard 90.1 simulation working group and other simulation experts on how to improve the representativeness of these building models. Finally, DOE believes that a critical mass of EnergyPlus users and sufficiently broad range of DOE contractor experience with the tools

meant that models could be reviewed and results examined sufficiently for the purpose of the preliminary determination.

### C. Summary of the Comparative Analysis

DOE carried out both a broad quantitative analysis and a detailed textual analysis of the differences between the requirements and the stringencies in the 2004 and the 2007 editions of Standard 90.1.

#### 1. Quantitative Analysis

The quantitative comparison of ASHRAE Standard 90.1–2007 was carried out using whole-building energy simulations of buildings built to both ASHRAE Standard 90.1–2004 and ASHRAE Standard 90.1–2007. DOE simulated 15 representative building types in 15 U.S. climate locations, each climate location selected to be representative of one of the 15 U.S. climate zones used in the definition of building energy code criteria in ASHRAE Standard 90.1–2004 and Standard 90.1–2007. The simulations were developed using specific building prototypes based on the DOE commercial benchmark building models developed for DOE's Net-Zero Energy Commercial Building Initiative.

For each building prototype simulated in each climate the energy use intensities (EUI) by fuel type and by end-use were extracted. These EUIs by fuel type for each building were then weighted to national average EUI figures using weighting factors based on the relative square footage of construction represented by that prototype in each of the 15 climate regions. These weighting factors were based on commercial building construction starts data for a five year period from 2003 to 2007. The source of data was the McGraw-Hill Construction Projects Starts Database

(MHC). The MHC database captures over 90% of new commercial construction in any given year and the collection process is independently monitored to ensure the coverage of most of the commercial construction in the U.S. The data is used by other federal agencies such as the U.S. Census Bureau, the Federal Reserve and the U.S. Department of Health and Human Services (HHS) for characterizing building construction in the U.S. For the purpose of developing construction weighting factors, the strength of this data lies in the number of samples, the characterization of each sample in terms of building end-use and size and number of stories, the frequency of data collection, and the detailed location data. In addition, the MHC database can be used to identify multi-family residential buildings that would be covered under ASHRAE Standard 90.1.

DOE's prototypes reflect the use of two fuel types, electricity and natural gas. Using the weighting factors, DOE was able to preliminarily establish an estimate of the relative reduction in building energy use, as determined by a calculated reduction in weighted average site EUI for each building prototype. Site energy refers to the energy consumed at the building site. In a corresponding fashion, DOE was also able to calculate a reduction in terms of weighted average primary EUI and in terms of weighted average energy cost intensity (ECI) in \$/sf of building floorspace. Primary energy as used here refers to the energy required to generate and deliver energy to the site. To estimate primary energy, all electrical energy use intensities were first converted to primary energy using a factor of 10,800 Btus primary energy per kWh (based on the 2009 estimated values reported in Table 2 of the EIA Annual Energy Outlook, 2009, April 2009 release available at <http://>

[www.eia.doe.gov/oiaf/aeo/](http://www.eia.doe.gov/oiaf/aeo/)). Natural Gas EUIs in the prototypes were converted to primary energy using a factor of 1.089 Btus primary energy per Btu of site natural gas use (based on the 2009 national energy use estimated shown in Table 2 of the AEO 2009). This natural gas source energy conversion factor was calculated by dividing the sum of all natural gas usage, including usage for natural gas field production, leases, plant fuel, and pipeline (compression) supply by delivered gas energy to the four primary energy sectors (residential, commercial, industrial, and transportation).

To estimate the reduction in energy cost index, DOE relied on national average commercial building energy prices of \$0.1028/kWh of electricity and \$11.99 per 1000 cubic feet (\$1.163/therm) of natural gas, based on EIA statistics for 2008 (the last complete year of data available in Table 5.3 Average Retail Price of Electricity to Ultimate Consumers: Total by End-Use Sector for the commercial sector—available from EIA at [http://www.eia.doe.gov/cneaf/electricity/epm/table5\\_3.html](http://www.eia.doe.gov/cneaf/electricity/epm/table5_3.html) and from the EIA Natural Gas Annual Summary for the commercial sector available at [http://tonto.eia.doe.gov/dnav/ng/ng\\_pri\\_sum\\_dcu\\_nus\\_a.htm](http://tonto.eia.doe.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm).) DOE recognizes that actual fuel costs will vary somewhat by building type within a region, and will in fact vary more across regions. Nevertheless, DOE believes that the use of simple national average figures illustrates whether there will be energy cost savings sufficient for the purposes of the DOE preliminary determination.

Energy use intensities developed for each representative building type were weighted by total national square footage of each representative building type to provide an estimate of the difference between the national energy use in buildings constructed to both editions of the Standard 90.1. Note that the 15 buildings types used in the preliminary determination reflect approximately 80% of the total square footage of commercial construction including multi-family buildings greater than three stories covered under ASHRAE Standard 90.1.

Note that only differences between new building requirements were considered in this quantitative analysis. Changes to requirements in the 2007 edition that pertain to existing buildings only are addressed in the detailed textual analysis only.

Both the 2007 and 2004 editions address additions and renovations to existing buildings. Since DOE has preliminarily found insufficient data to

characterize renovations in terms of what energy using features are utilized, DOE has not determined that the results obtained from the whole building prototypes used would reasonably reflect the EUI benefits that would accrue to renovated floor space. For this reason, renovated floor space is not included in the DOE weighting factors. Building additions on the other hand are believed to be substantially equivalent to new construction. For this reason, FW Dodge construction data on additions has been incorporated into the overall weighting factors. Floor space additions reflect approximately 13 percent of new construction floor space based on data captured in the FW Dodge dataset.

The quantitative analysis assumed the same base ventilation level for buildings constructed to Standard 90.1–2004 and Standard 90.1–2007. Neither edition of Standard 90.1 specifies ventilation rates for commercial building construction. ASHRAE has a separate ventilation standard for commercial construction, ASHRAE Standard 62.1 *Ventilation for Acceptable Indoor Air Quality*. This standard is cited only in a few exceptions within the mechanical sections of either ASHRAE 90.1–2004 or ASHRAE 90.1–2007, with each edition referencing a different version of standard 62.1. ASHRAE 90.1–2004 lists ASHRAE 62.1–1999 in its table of references. ASHRAE 90.1–2007 lists ASHRAE 62.1–2004 in its table of references. The latest version of ASHRAE Standard 62 is Standard 62.1–2007.

Ventilation rates can have significant impact on the energy use of commercial buildings. States and local jurisdictions typically specify the ventilation requirements for buildings within their respective building codes and can set these requirements independent of the energy code requirements. Because of the limited reference to ventilation within either the 2004 or the 2007 edition of ASHRAE 90.1, the requirements that States certify that their energy codes meet or exceed the 2007 edition of ASHRAE 90.1 would in general not require modification of State ventilation code requirements.

However, in many cases, ventilation requirements can be traced back to requirements found in one or another version of ASHRAE Standard 62.1. For the purpose of the quantitative analysis, DOE assumed ventilation rate for the simulation prototypes based on the requirements ASHRAE 62.1–2004. DOE also performed a sensitivity analysis which calculated the quantitative impacts assuming a ventilation rate based on ASHRAE Standard 62.1–1999.

The quantitative analysis of the energy consumption of buildings built to Standard 90.1–2007, as compared with buildings built to Standard 90.1–2004, indicates national primary energy savings of approximately 3.7 percent of commercial building energy consumption based on the weighting factors for the 15 buildings simulated. Site energy savings are estimated to be approximately 4.4 percent. Using national average fuel prices for electricity and natural gas DOE estimated a reduction in energy expenditures of 3.8 percent would result from the use of ASHRAE Standard 90.1–2007 as compared to ASHRAE Standard 90.1–2004. As identified previously, these estimated savings figures do not include energy savings from equipment or appliance standards that would be in place due to Federal requirements regardless of their presence in the ASHRAE Standard 90.1–2007.

We also performed a detailed analysis of the differences between the textual requirements and stringencies of the two editions of Standard 90.1 in the scope of the standard, the building envelope requirements, the building lighting and power requirements, and the building mechanical equipment requirements.

DOE works with the National Institute of Standards and Technology's (NIST) Building and Fire Research Laboratory on a variety of projects related to high-performance buildings. NIST is the main overseer of the Building Life Cycle Cost (BLCC) software used to support 10 CFR 436 and Federal life cycle costing requirements within the Federal sector. DOE and NIST co-chair the Building Technology Research and Development (BT R&D) committee under the Office of Science and Technology Policy (OSTP) as required under Section 913 of the Energy Policy Act of 2005. However, DOE does not typically work with NIST on determinations of energy efficiency of building standards. The technical work on DOE's determinations is provided by staff at Pacific Northwest National Laboratory's Building Energy Codes Program.

## 2. Detailed Textual Analysis

The emphasis of our detailed requirement and stringency analysis was on looking at the specific changes that ASHRAE made in going from Standard 90.1–2004 to Standard 90.1–2007. ASHRAE publishes changes to their standards as addenda to the preceding standard and then bundles all the addenda together to form the next edition. ASHRAE processed 44 addenda to Standard 90.1–2004 to create Standard 90.1–2007. Each of these

addenda was evaluated by DOE in preparing this preliminary determination.

In addition, each standard has multiple ways to demonstrate compliance, including a prescriptive set of requirements by section of the standard, various tradeoff approaches within those same sections, and a whole building performance method (Energy Cost Budget; "ECB"). For each addendum we identified whether it applies to the prescriptive requirements, or one of the tradeoff paths provided for in the envelope, lighting, or mechanical sections, or the ECB whole building performance path. For each addendum DOE identified the impact on the stringency for that path to compliance.

#### D. Preliminary Determination Statement

DOE's review and evaluation indicates that there are significant differences between the 2004 edition and the 2007 edition. Our overall preliminary conclusion is that the 2007 edition will improve the energy efficiency of commercial buildings. However, DOE identified two changes in textual requirements that taken alone appear to represent a reduction in stringencies and could decrease energy efficiency. The two changes are addendum "p" broadens the implicit definition of "visually impaired" as used in exceptions provided in the standard

which allow for lighting power to not be included in the calculated lighting power densities subject to maximum limits and addendum "av" which provides for an explicit shading credit allowed for louvered projections, where such a credit was not explicitly provided for in 90.1–2004. DOE believes that in these cases, the reduction in stringency was not considered a major impact. For the other addenda, DOE preliminarily determined that the remaining addenda either represented no change in stringency, or indicated a positive change in stringency corresponding to improved efficiency. Overall, DOE preliminarily concluded the changes in textual requirements and stringencies are "positive," in the sense that they would improve energy efficiency in commercial construction. Our quantitative analysis preliminarily shows that for the 15 prototype buildings, a weighted average national improvement in new building efficiency of 3.7 percent, when considering source energy, and by 4.4 percent, when considering site energy. As both the 2004 and 2007 editions cover existing buildings, to the extent that these standards are applied to existing buildings in retrofits or in new construction addition, the 2007 edition should improve the efficiency of the existing building stock. DOE has, therefore, preliminarily concluded that

Standard 90.1–2007 receive an affirmative determination under Section 304(b) of the ECPA.

## II. Results of Quantitative Analysis

Tables 3 and 4 show the aggregated energy use and associated energy savings by building type for the 15 building prototypes analyzed and on an aggregated national basis for the 2004 and 2007 editions, respectively. For each edition of Standard 90.1, the national building floor area weight used to calculate the national impact on building EUI or building ECI, is presented. The national average electricity and gas building energy use intensity is presented separately for each building prototype analyzed, electricity being the predominant energy usage in all prototypes. National-average site energy use intensities ranges from over five hundred Btu per square foot annually for the Fast Food prototype to approximately 28 Btu per square foot annually for the Non-refrigerated Warehouse type. Source energy use intensities and building energy cost intensities (\$/sf-yr) are also presented. Further details on the quantitative analysis can be found in the full preliminary quantitative analysis report available at [http://www.energycodes.gov/implement/determinations\\_90.1-2007.stm](http://www.energycodes.gov/implement/determinations_90.1-2007.stm).

TABLE 3—ESTIMATED ENERGY USE INTENSITY BY BUILDING TYPE—2004 EDITION

Building type	Building prototype	Building type floor area weight %	Whole building EUI data for building population kBtu/ft <sup>2</sup> -yr				
			Electric EUI	Gas EUI	Site EUI	Source EUI	ECI \$/ft <sup>2</sup> -yr
Office	Small Office	6.16	35.6	3.6	39.2	116.3	\$1.11
	Medium Office	6.64	42.1	4.2	46.3	137.5	1.32
	Large Office	3.65	34.4	5.7	40.1	114.6	1.10
Retail	Stand-Alone Retail	16.76	56.1	15.0	71.1	192.6	1.86
	Strip Mall	6.23	55.2	20.1	75.2	194.8	1.90
Education	Primary School	5.49	47.9	23.5	70.5	175.3	1.72
	Secondary School	11.38	43.7	19.5	62.4	157.8	1.54
Healthcare	Outpatient Health Care	4.80	106.7	54.7	153.2	392.6	3.85
	Hospital	3.79	96.3	57.6	153.1	362.7	3.57
Lodging	Small Hotel	1.89	48.3	26.1	74.3	179.0	1.76
	Large Hotel	5.44	68.5	84.4	152.3	301.2	3.04
Warehouse	Non-Refrigerated Warehouse	18.36	14.5	10.7	25.2	56.7	0.56
Food Service	Fast-Food Restaurant	0.64	226.5	326.1	527.9	1043.5	10.62
	Sit-Down Restaurant	0.72	179.3	202.1	370.5	770.2	7.75
Apartment	Mid-Rise Apartment	8.04	32.5	10.1	42.7	113.1	1.10
National		100	47.0	22.2	68.4	171.1	1.67

TABLE 4—ESTIMATED ENERGY USE INTENSITY BY BUILDING TYPE—2007 EDITION

Building type	Building prototype	Building type floor area weight %	Whole building EUI data for building population kBtu/ft <sup>2</sup> -yr				
			Electric EUI	Gas EUI	Site EUI	Source EUI	ECI \$/ft <sup>2</sup> -yr
Office	Small Office	6.16	35.3	3.3	38.6	115.2	\$1.10
	Medium Office	6.64	40.2	4.3	44.5	131.5	1.26
	Large Office	3.65	34.3	4.6	38.9	113.2	1.09
Retail	Stand-Alone Retail	16.76	51.4	13.3	64.7	176.1	1.70

TABLE 4—ESTIMATED ENERGY USE INTENSITY BY BUILDING TYPE—2007 EDITION—Continued

Building type	Building prototype	Building type floor area weight %	Whole building EUI data for building population kBtu/ft <sup>2</sup> -yr				
			Electric EUI	Gas EUI	Site EUI	Source EUI	ECI \$/ft <sup>2</sup> -yr
Education	Strip Mall	6.23	52.3	16.9	69.2	182.6	1.77
	Primary School	5.49	46.7	19.9	65.6	167.9	1.64
	Secondary School	11.38	42.5	16.6	58.4	151.3	1.47
Healthcare	Outpatient Health Care	4.80	102.1	52.8	147.0	376.4	3.69
	Hospital	3.79	95.8	56.2	151.2	359.7	3.54
Lodging	Small Hotel	1.89	46.5	24.7	71.2	172.1	1.69
	Large Hotel	5.44	69.1	79.1	147.6	298.0	3.00
Warehouse	Non-Refrigerated Warehouse	18.36	14.5	10.6	25.2	56.6	0.56
Food Service	Fast-Food Restaurant	0.64	222.1	319.5	516.9	1023.0	10.41
	Sit-Down Restaurant	0.72	177.5	200.0	366.7	762.4	7.67
Apartment	Mid-Rise Apartment	8.04	31.8	9.0	40.8	109.8	1.06
National		100	45.5	20.6	65.4	164.8	1.61

Table 5 presents the estimated percent energy savings (based on change in EUI) between the 2004 and 2007 editions. Overall, considering those differences that can be reasonably quantified, the 2007 edition is expected to increase the

energy efficiency of commercial buildings. Numbers in Table 5 represent percent energy savings; thus, negative numbers represent increased energy use. There is a decrease in gas EUI for all building types except medium office.

This decrease in gas EUI represents the majority of the national site energy savings from the 2007 edition. There is a decrease in electrical EUI for all building prototypes except for large hotel.

TABLE 5—ESTIMATED PERCENT ENERGY SAVINGS WITH 2007 EDITION—BY BUILDING TYPE

Building type	Building prototype	Building type floor area weight %	Percent savings in whole building energy use intensity (%)				
			Electric EUI	Gas EUI	Site EUI	Source EUI	ECI
Office	Small Office	6.16	0.8	9.0	1.5	1.0	1.1
	Medium Office	6.64	4.6	-2.3	3.9	4.4	4.3
	Large Office	3.65	0.3	18.0	2.8	1.2	1.4
Retail	Stand-Alone Retail	16.76	8.3	11.2	9.0	8.6	8.6
	Strip Mall	6.23	5.2	15.6	8.0	6.3	6.5
Education	Primary School	5.49	2.5	15.4	6.9	4.2	4.6
	Secondary School	11.38	2.6	14.8	6.4	4.1	4.4
Healthcare	Outpatient Health Care	4.80	4.2	3.4	4.0	4.1	4.1
	Hospital	3.79	0.6	2.3	1.2	0.8	0.9
Lodging	Small Hotel	1.89	3.6	5.2	4.2	3.9	3.9
	Large Hotel	5.44	-1.0	6.3	3.0	1.1	1.4
Warehouse	Non-Refrigerated Warehouse	18.36	0.0	0.7	0.3	0.2	0.2
Food Service	Fast Food Restaurant	0.64	1.9	2.0	2.1	2.0	2.0
	Sit-Down Restaurant	0.72	1.0	1.0	1.0	1.0	1.0
Apartment	Mid-Rise Apartment	8.04	2.1	11.5	4.3	2.9	3.1
National		100	3.2	6.9	4.4	3.7	3.8

**III. Discussion of Detailed Textual Analysis**

A qualitative analysis of all addenda to ANSI/ASHRAE/IESNA Standard 90.1-2004 that were included in ANSI/ASHRAE/IESNA Standard 90.1-2004 was conducted. All 44 addenda processed by ASHRAE in the creation of Standard 90.1-2007 from Standard 90.1-2004 were evaluated by DOE for their impact on energy efficiency. DOE preliminarily determined whether that addenda would have a positive, neutral, or negative impact on overall building efficiency. Table S-1 shows the potential number of positive and negative changes for each section of Standard 90.1.

The preliminary results of the textual analysis indicate that the majority of changes (30 of the total of 44 listed) were neutral. These include editorial changes, changes to reference standards, changes to alternative compliance paths, and other changes to the text of the standard that may improve the usability of the standard, but do not generally improve or degrade the energy efficiency of building. There were 11 changes that were evaluated as having a positive impact on energy efficiency and 2 changes that were evaluated as having a negative impact on energy efficiency.

*The 2 negative impacts on energy efficiency include:*

1. Addendum p—Expanded lighting power exceptions allowed for use with the visually impaired; and

2. Addendum av—Allowance for louvered overhangs.

*The 11 positive impacts on energy efficiency include:*

1. Addendum c—Increased requirement for building vestibules;
2. Addendum h—Removal of data processing centers from exceptions to HVAC requirements;
3. Addendum q—Removal of hotel room exceptions to HVAC requirements;
4. Addendum v—Modification of demand controlled ventilation requirements;
5. Addendum ac—Modification of fan power limitations;

6. Addendum ai—Modification of retail display lighting requirements;  
7. Addendum ak—Modification of cooling tower testing requirements;  
8. Addendum an—Modification of commercial boiler requirements;

9. Addendum ar—Modification of part load fan requirements;  
10. Addendum as—Modification of opaque envelope requirements; and  
11. Addendum at—Modification of fenestration envelope requirements.

The results of the textual analysis are shown in Table 6. Overall, the potential positive impacts outweigh the potential negative impacts in a simple numerical comparison.

TABLE 6—RESULTS OF TEXTUAL ANALYSIS BY SECTION OF STANDARD 90.1

Section of standard	Number of changes made to section	Number of positive (energy saving) changes	Number of unquantifiable changes	Number of neutral (no energy saving) changes	Number of negative (energy increasing) changes
Title, Purpose, and Scope .....	0	0	0	0	0
Definitions .....	0	0	0	0	0
Administration and Enforcement ..	0	0	0	0	0
Envelope and Normative Appendices .....	11	3	0	7	1
HVAC Equipment and Systems ...	13	6	0	7	0
Service Water Heating .....	0	0	0	0	0
Power .....	0	0	0	0	0
Lighting .....	9	2	1	5	1
Energy Cost Budget and Appendix G Performance Rating Method .....	7	0	0	7	0
Normative and Informative References .....	4	0	0	4	0
Overall .....	44	11	1	30	2

#### IV. Filing Certification Statements With DOE

##### A. Review and Update

If today's determination is finalized, each State would be required to review and update, as necessary, the provisions of its commercial building energy code to meet or exceed the provisions of the 2007 edition of Standard 90.1. (42 U.S.C. 6833(b)(2)(B)(i)) This action would be required to be taken not later than two years from the date of the final determination notice, unless an extension is provided.

The DOE recognizes that some States do not have a State commercial building energy code or have a State code that does not apply to all commercial buildings. If local building energy codes regulate commercial building design and construction rather than a State code, the State must review and make all reasonable efforts to update as authorized those local codes to determine whether they meet or exceed the 2007 edition of Standard 90.1. States may base their certifications on reasonable actions by units of general purpose local government. Each such State must still review the information obtained from the local governments and gather any additional data and testimony for its own certification.

States should be aware that the DOE considers high-rise (greater than three stories) multi-family residential buildings, hotel, motel, and other transient residential building types of any height as commercial buildings for energy code purposes. Consequently,

commercial buildings, for the purposes of certification, would include high-rise (greater than three stories) multi-family residential buildings, hotel, motel, and other transient residential building types of any height.

##### B. Certification

Section 304(b) of ECPA requires each State to certify to the Secretary of Energy that it has reviewed and updated the provisions of its commercial building energy code regarding energy efficiency to meet or exceed the Standard 90.1–2007 edition. (42 U.S.C. 6833(b)) The certification must include a demonstration that the provisions of the State's commercial building energy code regarding energy efficiency meet or exceed Standard 90.1–2007. If a State intends to certify that its commercial building energy code already meets or exceeds the requirements of Standard 90.1–2007, the State should provide an explanation of the basis for this certification, *e.g.*, Standard 90.1–2007 is incorporated by reference in the State's building code regulations. The chief executive of the State (*e.g.*, the Governor) or a designated State official, such as the Director of the State energy office, State code commission, utility commission, or equivalent State agency having primary responsibility for commercial building energy codes, would provide the certification to the Secretary. Such a designated State official would also provide the certifications regarding the codes of units of general purpose local

government based on information provided by responsible local officials.

DOE does list the States that have filed certifications and those that have or have not adopted new codes. Once a State has adopted a new commercial code, DOE typically provides software, training, and support for the new code as long as the new code is based on the national model codes (in this case, ASHRAE Standard 90.1). Some States develop their own codes that are only loosely related to the national model codes and DOE does not typically provide technical support for those codes. However, DOE does provide grants to these States through grant programs administered by the National Energy Technology Laboratory (NETL). Each state is unique in how they go about adopting and enforcing their energy codes.

##### C. Request for Extensions To Certify

Section 304(c) of ECPA, requires that the Secretary permit an extension of the deadline for complying with the certification requirements described above, if a State can demonstrate that it has made a good faith effort to comply with such requirements and that it has made significant progress toward meeting its certification obligations. (42 U.S.C. 6833(c)) Such demonstrations could include one or both of the following: (1) A plan for response to the requirements stated in section 304; or (2) a statement that the State has appropriated or requested funds (within State funding procedures) to implement a plan that would respond to the

requirements of Section 304 of ECPA. This list is not exhaustive.

## V. Regulatory Analysis

### A. Review Under Executive Order 12866

Today's action is a significant regulatory action under section 3(f)(1) of Executive Order 12866, "Regulatory Planning and Review" (58 FR 51735; October 4, 1993). Accordingly, today's action was reviewed by the Office of Information and Regulatory Affairs (OIRA) in the Office of Management and Budget (OMB).

### B. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires the preparation of an initial regulatory flexibility analysis for any rule that by law must be proposed for public comment, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. As required by Executive Order 13272, "Proper Consideration of Small Entities in Agency Rulemaking," (67 FR 53461; August 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the potential impacts of its rules on small entities are properly considered during the rulemaking process (68 FR 7990). DOE has made its procedures and policies available on the Office of General Counsel's Web site: <http://www.gc.doe.gov>. Today's action on the determination of improved energy efficiency between the ASHRAE 2004 and 2007 of Standard 90.1 would require States to undertake an analysis of their respective building codes. Today's action does not impact small entities. Therefore, the analytical requirements of the Regulatory Flexibility Act do not apply.

### C. Review Under the National Environmental Policy Act of 1969

DOE has preliminarily determined that today's action is covered under the Categorical Exclusion found in DOE's National Environmental Policy Act regulations at paragraph A.6. of Appendix A to subpart D, 10 CFR part 1021. That Categorical Exclusion applies to actions that are strictly procedural, such as rulemaking establishing the administration of grants. Today's action is required by Title III of ECPA, as amended, which provides that whenever the Standard 90.1-1989, or any successor to that code, is revised, the Secretary must make a determination, not later than 12 months after such revision, whether the

revised code would improve energy efficiency in commercial buildings and must publish notice of such determination in the **Federal Register**. (42 U.S.C. 6833(b)(2)(A)) If the Secretary determines that the revision of Standard 90.1-1989 or any successor thereof, improves the level of energy efficiency in commercial buildings then no later than two years after the date of the publication of such affirmative determination, each State is required to certify that it has reviewed and updated the provisions of its commercial building code regarding energy efficiency with respect to the revised or successor code. (42 U.S.C. 6833(b)(2)(B)(i)) If the Secretary makes a determination that the revised standard will not improve energy efficiency in commercial buildings then State commercial codes shall meet or exceed the last revised standard for which the Secretary has made a positive determination. (42 U.S.C. 6833(b)(2)(B)(ii)) Therefore, DOE has preliminarily determined that the Secretary's determination is not a major federal action that would have direct environmental impacts. Accordingly, DOE has not prepared an environmental assessment or an environmental impact statement.

### 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 pre-empt 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. DOE has reviewed the statutory authority. Congress found that:

(1) Large amounts of fuel and energy are consumed unnecessarily each year in heating, cooling, ventilating, and providing domestic hot water for newly constructed residential and commercial buildings because such buildings lack adequate energy conservation features;

(2) Federal voluntary performance standards for newly constructed buildings can prevent such waste of energy, which the Nation can no longer afford in view of its current and anticipated energy shortage;

(3) The failure to provide adequate energy conservation measures in newly constructed buildings increases long-term operating costs that may affect adversely the repayment of, and security for, loans made, insured, or guaranteed by Federal agencies or made by

federally insured or regulated instrumentalities; and

(4) State and local building codes or similar controls can provide an existing means by which to assure, in coordination with other building requirements and with a minimum of Federal interference in State and local transactions, that newly constructed buildings contain adequate energy conservation features. (42 U.S.C. 6831)

Pursuant to Section 304(b) of ECPA, DOE is statutorily required to determine whether the most recent versions of ASHRAE 90.1 would improve the level of energy efficiency in commercial buildings as compared to the previous version. If DOE makes a positive determination, the statute requires each State to certify that it has reviewed and updated the provisions of its commercial building code regarding energy efficiency with respect to the revised or successor codes. (42 U.S.C. 6833(b)(2)(B)(i)).

Executive Order 13132, 64 FR 43255 (August 4, 1999) requires meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications unless "funds necessary to pay the direct costs incurred by the State and local governments in complying with the regulation are provided by the Federal Government." (62 FR 43257) Pursuant to Section 304(e) of ECPA, the DOE Secretary is required to "provide incentive funding to States to implement the requirements of [Section 304], and to improve and implement State residential and commercial building energy efficiency codes, including increasing and verifying compliance with such codes. In determining whether, and in what amount, to provide incentive funding under this subsection, the Secretary shall consider the actions proposed by the State to implement the requirements of this section, to improve and implement residential and commercial building energy efficiency codes, and to promote building energy efficiency through the use of such codes." (42 U.S.C. 6833(e)) Therefore, consultation with States and local officials regarding this preliminary determination was not required.

However, DOE notes that State and local governments were invited to participate in the development Standard 90.1-2007. Standard 90.1-2007, was developed in a national American National Standards Institute consensus process open to the public and in which State and local governments participate along with DOE and other interested parties. It is the product of a series of amendments to the prior addition of the

standard. Each addendum is put out for national public review. Anyone may submit comments, and in the process comments were received from State and local governments. Comments on the addendum are received, reviewed and resolved through a consensus process. Members of the standards project committee have included representatives of State and local governments.

DOE annually holds a national building energy codes workshop at which the progress on development of the model energy codes are presented, along with discussion and sharing of problems and successes in adoption, implementation, and enforcement of building energy codes. The predominate attendance of these workshops are State and local officials responsible for building energy codes. They are consistently encouraged and urged to participate in the model building energy code processes, which will be the subject of DOE's next determinations under section 304 of ECPA. Thus, State and local officials have had the opportunity to participate in the development of the standard through the ASHRAE process. Some have done so.

Similarly, the comments of States and local governments about provisions of the developing Standard 90.1–2007 were received in formal comment periods and heard and addressed in ASHRAE committee deliberations open to the public. In addition, concerns and issues about adoption, implementation and enforcement issues were presented and discussed at informal sessions at the Department's annual national workshops on building energy codes. DOE believes that the above process has given State and local jurisdictions extensive opportunity to comment on and express their concerns on Standard 90.1–2007, the subject of this determination.

On issuance of this determination that Standard 90.1–2007 would improve the energy efficiency of commercial buildings, ECPA requires the States to certify to the Secretary that it has reviewed and updated the provisions of its commercial building code regarding energy efficiency to meet or exceed the requirements of Standard 90.1–2007. States are given broad freedom to either adopt Standard 90.1–2007 or develop their own code that meets equivalent energy efficiency.

#### *E. Review Under the Unfunded Mandates Reform Act of 1995*

The Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) generally requires Federal agencies to examine

closely the impacts of regulatory actions on State, local, and tribal governments. Subsection 101(5) of Title I of that law defines a Federal intergovernmental mandate to include any regulation that would impose upon State, local, or tribal governments an enforceable duty, except a condition of Federal assistance or a duty arising from participating in a voluntary Federal program. Title II of that law requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and tribal governments, in the aggregate, or to the private sector, other than to the extent such actions merely incorporate requirements specifically set forth in a statute. Section 202 of that title requires a Federal agency to perform a detailed assessment of the anticipated costs and benefits of any rule that includes a Federal mandate which may result in costs to State, local, or tribal governments, or to the private sector, of \$100 million or more. Section 204 of that title requires each agency that proposes a rule containing a significant Federal intergovernmental mandate to develop an effective process for obtaining meaningful and timely input from elected officers of State, local, and tribal governments.

If today's determination is finalized, each State would be required under Section 304 of ECPA to review and update, as necessary, the provisions of its commercial building energy code to meet or exceed the provisions of the 2007 edition of Standard 90.1. (42 U.S.C. 6833(b)(2)(B)(i)) Section 304 of ECPA requires State action in response to a positive determination by DOE. While the processes that States may undertake to update their codes vary widely, as a general rule a State at a minimum would need to:

- Evaluate Standard 90.1–2007 using the background material provided by DOE
- Compare the existing State commercial building energy code to Standard 90.1–2007 to see if an update is needed
- Update the State commercial building energy code to meet or exceed Standard 90.1–2007.

DOE evaluated the potential for State activity to exceed \$100 million in any one year. The approach looked at the 3 steps for minimum activity listed in the previous paragraph—evaluate, compare and update. A fourth potential step of providing training on the new code was also considered as some States may consider training on the new code to be an integral part of adopting the new code. For the 3 steps of minimum activity, DOE estimated the following:

Evaluate Standard 90.1–2007—DOE estimated a minimum of 8 hours of review per State and a maximum review time of 500 hours of review per State (12.5 work weeks). The minimum review time of 8 hours (one day) is the estimated minimum amount of time can see states taking to review Standard 90.1–2007. Simply reading and reviewing the **Federal Register** notice, the qualitative analysis document and the quantitative analysis document will take the average person several hours. Deciding on whether or not to upgrade to Standard 90.1–2007 may take another couple of hours. The maximum review time of 500 hours (62.5 day, 3 working months) upper limit was estimated as the amount of time that a state that was not familiar with energy codes at all or which has a particularly arduous review process within the state would take to review these documents.

(1) A cost per hour of \$100 per hour was assumed based on actual rates proposed in subcontracts associated with compliance studies funded by DOE. The average rate calculated from these subcontracts for 10 types of building officials from 6 states was \$93.41, so DOE chose to round this up to \$100 per hour.

- a. Low estimate—8 hours \* 50 states \* \$100 per hour = \$40,000
- b. High estimate—500 hours \* 50 states \* \$100 per hour = \$2,500,000

(2) Compare Standard 90.1–2007 to existing state code—Assuming the State is familiar with its code and has performed an effective evaluation of Standard 90.1 in the first step, the range of potential costs should be similar to Step 1. (See Step 1 for discussion of 8 hour and 500 hour times and \$100 per hour cost estimate).

- a. Low estimate—8 hours \* 50 states \* \$100 per hour = \$40,000
- b. High estimate—500 hours \* 50 states \* \$100 per hour = \$2,500,000

(3) Update the State Codes to meet or exceed Standard 90.1–2007—Adopting a new energy code could be as simple as updating an order within the State, or it could be very complex involving hearings, testimony, etc. Again, the range of potential costs should be similar to Step 1. (See Step 1 for discussion of origin of 8 hour and 500 hour times and \$100 per hour cost estimate).

- a. Low estimate—8 hours \* 50 states \* \$100 per hour = \$40,000
- b. High estimate—500 hours \* 50 states \* \$100 per hour = \$2,500,000

The potential range of total costs to States to under these assumptions would be \$120,000 to \$7.5 million. This range is well below the \$100 million threshold in the Unfunded Mandates Act. DOE has also considered potential costs were States to include provide training on the new code.

(4) Train Code officials on New Code—Assuming every jurisdiction has at least one person that needs to be trained on energy code. There are roughly 40,000 general purpose local governments, or jurisdictions, in the U.S. The total number of jurisdictions in the U.S. that enforce energy codes is not known with any degree of certainty. The National League of Cities publishes an estimate of the number of local governments in the U.S. at [http://www.nlc.org/about\\_cities/cities\\_101/142.aspx](http://www.nlc.org/about_cities/cities_101/142.aspx). Their summary indicates the following:

- 19,429 Municipal governments;
- 16,504 Town or Township governments;
- 3,034 County governments;
- 13,506 School districts; and
- 35,052 Special district governments.

DOE believes it is reasonable to assume that all of the municipal governments, town or township governments, and county governments could be required to acquire training on Standard 90.1–2007 in order to enforce this standard as an adopted energy code. In addition, the 50 state governments would be required to acquire training. This number adds up to 19,429 + 16,504 + 3,034 + 50 = 38,667. Another widely mentioned estimate of the total number of code adopting jurisdictions in the U.S. is 44,000. This number is based on the National Conference of States on Building Codes and Standards (NCBCS). See, for example, [http://www.ncbcs.org/newsite/New%20Releases/RW\\_Presentation\\_060602.htm](http://www.ncbcs.org/newsite/New%20Releases/RW_Presentation_060602.htm). Both these estimates are in reasonable agreement and so DOE assumed that there are 40,000 potential jurisdictions that potentially would need training on a new energy code. This number is likely to be on the extreme high end of possible values. DOE believes there are approximately 38,000 to 44,000 jurisdictions that could adopt energy codes. Many of those jurisdictions do not adopt energy codes and many of those jurisdictions have already adopted Standard 90.1–2007 or the 2009 IECC as evidenced by the BECP maps that show 14 states have already adopted 90.1–2007 or the equivalent. DOE believes that 40,000 is very much on the high side of the estimate for jurisdictions that may need training on Standard 90.1–2007, but in the absence of a lower defensible value, DOE has chosen to use this higher conservative number.

Based on training experiences of the Building Energy Codes Program staff, with conducting training sessions for jurisdictional staff regarding Standard 90.1, one full-day (8 hours) of training

is normally sufficient. Therefore we have used 8 hours as a low estimate and 16 hours as a high estimate for training hours required if a jurisdiction were to adopt Standard 90.1–2007.

- a. Low estimate—8 hours \* 40,000 jurisdictions \* \$100 per hour = \$32,000,000
- b. High Estimate—16 hours \* 40,000 jurisdictions \* \$100 per hour = \$64,000,000

Adding the potential training costs of \$32 million to \$64 million to the costs for the 3 steps indicates a potential total costs ranging from \$32.12 million to \$71.5 million. The high end of this estimate is less than the \$100 million threshold in the Unfunded Mandates Act. Accordingly, no further action is required under the Unfunded Mandates Reform Act of 1995.

#### *F. Review Under the Treasury and General Government Appropriations Act of 1999*

Section 654 of the Treasury and General Government Appropriations Act of 1999 (Pub. L. 105–277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. Today's action would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

#### *G. Review Under the Treasury and General Government Appropriations Act of 2001*

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

#### *H. Review Under Executive Order 13211*

Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," 66 FR 28355 (May 22, 2001), requires Federal agencies to prepare and submit to the OMB a Statement of Energy Effects for any proposed significant energy action. A "significant energy action" is defined as

any action by an agency that promulgated or is expected to lead to promulgation of a final rule, and that: (1) Is a significant regulatory action under Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy; or (3) is designated by the Administrator of the Office of Information and Regulatory Affairs (OIRA) as a significant energy action. For any proposed significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use, should the proposal be implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use.

Today's action would not have a significant adverse effect on the supply, distribution, or use of energy and is therefore not a significant energy action. Accordingly, DOE has not prepared a Statement of Energy Effects.

#### *I. Review Under Executive Order 13175*

Executive Order 13175, "Consultation and Coordination with Indian tribal Governments" (65 FR 67249; November 9, 2000), requires DOE to develop an accountable process to ensure "meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications." "Policies that have tribal implications" refers to regulations that have "substantial direct effects on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes." Today's regulatory action is not a policy that has "tribal implications" under Executive Order 13175. DOE has reviewed today's action under Executive Order 13175 and has determined that it is consistent with applicable policies of that Executive Order.

## **VI. Public Participation**

The public is invited to submit comments on the preliminary determinations. Comments must be provided by October 4, 2010 using any of the methods described in the **ADDRESSES** section of this notice. If you submit information that you believe to be exempt by law from public disclosure, you should submit one complete copy, as well as one copy from which the information claimed to be exempt by law from public disclosure has been deleted. DOE is responsible for the final determination with regard to disclosure or nondisclosure of the information and for treating it accordingly under the DOE Freedom of

Information regulations at 10 CFR 1004.11.

## VII. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this preliminary determination.

Issued in Washington, DC, on August 26, 2010.

**Cathy Zoi,**

*Assistant Secretary, Energy Efficiency and Renewable Energy.*

[FR Doc. 2010-22060 Filed 9-2-10; 8:45 am]

**BILLING CODE 6450-01-P**

## DEPARTMENT OF ENERGY

[Docket No. EERE-2010-BT-DET-0030]

RIN 1904-AC17

### Updating State Residential Building Energy Efficiency Codes

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

**ACTION:** Notice of proposed determination.

**SUMMARY:** The Department of Energy (DOE or Department) has preliminarily determined that the 2009 version of the International Code Council (ICC) International Energy Conservation Code (IECC) would achieve greater energy efficiency in low-rise residential buildings than the 2006 IECC. Also, DOE has preliminarily determined that the 2006 version of the IECC would achieve greater energy efficiency than the 2003 IECC. Finally, DOE has preliminarily determined that the 2003 version of the IECC would not achieve greater energy efficiency than the 2000 IECC. If these determinations are finalized, States would be required to file certification statements to DOE that they have reviewed the provisions of their residential building code regarding energy efficiency and made a determination as to whether to update their code to meet or exceed the most recent code with an affirmative determination, the 2009 IECC. Additionally, this Notice provides guidance to States on how the codes have changed from previous versions, how to submit certifications, and how to request extensions of the deadline to submit certifications, should the preliminary determinations be adopted as final.

**DATES:** Comments on the preliminary determinations must be provided by October 4, 2010.

**ADDRESSES:** You may submit comments, identified by any of the following methods:

- *Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the instructions for submitting comments.

- *E-mail:* [ronald.majette@ee.doe.gov](mailto:ronald.majette@ee.doe.gov). Include RIN 1904-AC17 in the subject line of the message.

- *Postal Mail:* Mr. Ronald B. Majette, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Forrestal Building, Mail Station EE-2J, 1000 Independence Avenue, SW., Washington, DC 20585-0121. Please submit one signed paper original.

- *Hand Delivery/Courier:* Mr. Ronald B. Majette, U.S. Department of Energy, Federal Energy Management Program, Room 6003, 1000 Independence Avenue, SW., Washington, DC 20585-0121.

*Instructions:* All submissions must include the agency name, Department of Energy, and docket number, EERE-2010-BT-DET-0030, or Regulatory Information Number (RIN), 1904-AC17, for this rulemaking.

**FOR FURTHER INFORMATION CONTACT:** Mr. Ronald B. Majette, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Forrestal Building, Mail Station EE-2J, 1000 Independence Avenue, SW., Washington, DC 20585-0121, 202-586-7935. For legal issues contact Chris Calamita, U.S. Department of Energy, Office of the General Counsel, Forrestal Building, GC-72, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586-9507, *e-mail:*

*Christopher.Calamita@hq.doe.gov.*

#### SUPPLEMENTARY INFORMATION:

- I. Introduction
  - A. Statutory Requirements
  - B. Background
  - C. DOE's Preliminary Determination Statements
- II. Discussion of Changes in the 2003, 2006, and 2009 IECC
  - A. 2003 IECC Compared With the 2000 IECC
  - B. 2006 IECC Compared With the 2003 IECC
  - C. 2009 IECC Compared With the 2006 IECC
- III. Comparison of the 2009 IRC to the 2009 IECC
- IV. Filing Certification Statements With DOE
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- E. Review Under the Unfunded Mandates Reform Act of 1995
- F. Review Under the Treasury and General Government Appropriations Act of 1999
- G. Review Under the Treasury and General Government Appropriations Act of 2001
- H. Review Under Executive Order 13211
- I. Review Under Executive Order 13175
- VI. Public Participation
- VII. Approval of the Office of the Secretary

## I. Introduction

### A. Statutory Requirements

Title III of the Energy Conservation and Production Act, as amended (ECPA), establishes requirements for the Building Energy Standards Program. (42 U.S.C. 6831-6837) Section 304(b) of ECPA, as amended, provides that when the 1992 Model Energy Code, or any successor to that code, is revised, the Secretary of the Department of Energy must determine, not later than 12 months after the revision, whether the revised code would improve energy efficiency in residential buildings and must publish notice of the determination in the **Federal Register**. (42 U.S.C. 6833(a)(5)(A)) The Department, following precedent set by the International Code Council (ICC) and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) considers high-rise (greater than three stories) multifamily residential buildings and hotel, motel, and other transient residential building types of any height as commercial buildings for energy code purposes. Low-rise residential buildings include one- and two-family detached and attached buildings, duplexes, townhouses, row houses, and low-rise multifamily buildings (not greater than three stories) such as condominiums and garden apartments.

If the Secretary determines that the revision would improve energy efficiency then, not later than 2 years after the date of the publication of the affirmative determination, each State is required to certify that it has compared its residential building code regarding energy efficiency to the revised code and made a determination whether it is appropriate to revise its code to meet or exceed the provisions of the successor code. (42 U.S.C. 6833(a)(5)(B)) State determinations are to be made: (1) After public notice and hearing; (2) in writing; (3) based upon findings included in such determination and upon evidence presented at the hearing; and (4) available to the public. (See, 42 U.S.C. 6833(a)(5)(C)) In addition, if a State determines that it is not appropriate to revise its residential building code, the State is required to submit to the Secretary, in writing, the reasons, which