

11 a.m. Welcome and Roll Call;  
Opening Remarks by the Committee  
Chair; Program Status Update Since  
the Last Meeting.

12:45 p.m. Public Comments.

1 p.m. Adjourn.

**Public Participation:** The meeting is open to the public. The Designated Federal Officer and the Chairman of the Committee will lead the meeting for the orderly conduct of business. Individuals who would like to attend must RSVP by e-mail to:

[UnconventionalResources@hq.doe.gov](mailto:UnconventionalResources@hq.doe.gov) no later than 12 p.m. on Tuesday, October 25, 2011. Please provide your name, organization, and citizenship. Anyone attending the meeting will be required to present government issued photo identification. Space is limited. If you would like to file a written statement with the Committee, you may do so either before or after the meeting. If you would like to make oral statements regarding any of the items on the agenda, you should contact Elena Melchert at the address or telephone number listed above. You must make your request for an oral statement at least two business days prior to the meeting, and reasonable provisions will be made to include the presentation on the agenda. Public comment will follow the three minute rule.

**Minutes:** The minutes of this meeting will be available for public review and copying within 60 days at: <http://www.fossil.energy.gov/programs/oilgas/advisorycommittees/UnconventionalResources.html>.

Issued at Washington, DC, on October 11, 2011.

**LaTanya Butler,**

*Acting Deputy Committee Management Officer.*

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**BILLING CODE 6450-01-P**

## DEPARTMENT OF ENERGY

[Docket No. EERE-2011-BT-DET-0057]

RIN 1904-AC59

### Updating State Residential Building Energy Efficiency Codes

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

**ACTION:** Notice of preliminary determination.

**SUMMARY:** The Department of Energy (DOE or Department) has preliminarily determined that the 2012 edition of the International Code Council (ICC) International Energy Conservation Code (IECC) (2012 IECC or 2012 edition)

would achieve greater energy efficiency in low-rise residential buildings than the 2009 IECC. Upon publication of an affirmative final determination, 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 2012 IECC. Additionally, this Notice provides guidance to States on how the codes have changed from previous versions, and the certification process should this preliminary determination be finalized.

**DATES:** Comments on this preliminary determination must be provided by November 18, 2011.

**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:** [michael.erbesfeld@ee.doe.gov](mailto:michael.erbesfeld@ee.doe.gov). Include RIN 1904-AC59 in the subject line of the message.

- **Postal Mail:** Mr. Michael Erbesfeld, 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. Michael Erbesfeld, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, 950 L'Enfant Building, Room 6014, 950 L'Enfant Plaza, Washington, DC 20024.

- **Instructions:** All submissions must include the agency name, Department of Energy, and docket number, EERE-2011-BT-DET-0057, or Regulatory Information Number (RIN), (1904-AC59) for this determination.

**FOR FURTHER INFORMATION CONTACT:**

Michael Erbesfeld, 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) 287-1874, *e-mail:*

[michael.erbesfeld@ee.doe.gov](mailto:michael.erbesfeld@ee.doe.gov). For legal issues contact Kavita Vaidyanathan, 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.vaidyanathan@hq.doe.gov](mailto:kavita.vaidyanathan@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 Standards Program. (42 U.S.C. 6831-6837) Section 304(a) of ECPA, as amended, provides that when the 1992 Model Energy Code (MEC), or any successor to that code, is revised, the Secretary 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 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 are to be made available to the public. (See, 42 U.S.C. 6833(a)(5)(C).)

### B. Background

The ICC's IECC establishes a national model code for energy efficiency requirements for buildings. In 1997, the Council of American Building Officials (CABO) was incorporated into the ICC and the MEC was renamed to the IECC. A previous **Federal Register** notice, 59 FR 36173, July 15, 1994, announced the Secretary's determination that the 1993 MEC increased energy efficiency relative to the 1992 MEC for residential buildings. Similarly, another **Federal Register** notice, 61 FR 64727, December 6, 1996, announced the Secretary's determination that the 1995 MEC is an improvement over the 1993 MEC. **Federal Register** notice 66 FR 1964, January 10, 2001, simultaneously announced the Secretary's determination that the 1998 IECC is an improvement over the 1995 MEC and the 2000 IECC is an improvement over the 1998 IECC. Finally **Federal Register** notice 76 FR 42688, July 19, 2011, announced the Secretary's determination that the 2003 IECC was not a substantial improvement over its predecessor, while the 2006 and 2009 editions were a substantial improvement over its predecessors.

### C. DOE's Preliminary Determination Statement

The 2012 IECC has a substantial variety of revisions compared to the 2009 IECC. Most of these revisions appear to directly improve energy efficiency that, on the whole, would result in a significant improvement in efficiency to homes built to the code. Therefore, the Department preliminarily concludes that the 2012 edition of the IECC should receive an affirmative determination under Section 304(a) of ECPA.

## II. Discussion of Changes in the 2012 IECC Compared With the 2009 IECC Summary

The 2012 IECC appears to improve residential energy efficiency with respect to the 2009 IECC. Based on DOE's preliminary analysis, a preponderance of major energy efficiency improvements more than offset a small number of changes which have unclear or negative impacts on energy efficiency. The major changes that are estimated to improve energy efficiency in new homes built to comply with the code in most climate zones include:

- Building thermal envelope improvements.
  - Increases in prescriptive insulation levels of walls, roofs and floors.
  - Decrease (improvement) in U-factor allowances for fenestration.
  - Decrease (improvement) in allowable Solar Heat Gain Coefficient (SHGC) for fenestration in warm climates.
- Infiltration control: Mandated whole-house pressure test with strict allowances for air leakage rates.
- Wall insulation when structural sheathing is used.
- Ventilation fan efficiency.
- Lighting—Increased fraction of lamps required to be high-efficacy.
- Air distribution systems—leakage control requirements.
- Hot water pipe insulation and length requirements.
- Skylight definition change.
- Penalizing electric resistance heating in the performance compliance path.
- Fireplace air leakage control.
- Insulating covers for in-ground hot tubs and spas.
- Baffles for attic insulation.

Changes that appear to decrease residential efficiency in some situations include the following.

- Steel-framed wall insulation.
  - Air barrier location.
- Changes whose effect is unclear:
- Fenestration SHGC requirement in climate zone 4.
  - Interior shading assumptions in the performance compliance path.

All of the changes that are estimated to positively or negatively impact energy efficiency are discussed in the following text.

### A. Changes in the 2012 IECC That Are Estimated To Increase Energy Efficiency

#### Building Thermal Envelope Improvements

Table R402.1.1 which specifies prescriptive envelope requirements, has

been extensively modified in the 2012 IECC compared to the 2009 IECC. This table represents the code's primary regulation of a home's envelope thermal resistance, or the resistance of the ceilings, walls, windows, and floors to the transfer of heat into or out of the home. The criteria are expressed as either R-values (Btu/h-ft<sup>2</sup>-F), which quantify a building component's resistance to heat flow, or U-factors (h-ft<sup>2</sup>-F/Btu), which are the inverse of R-values and represent a component's thermal conductance. A higher R-value or a lower U-factor represents an efficiency improvement. Table R402.1.1 also includes requirements for glazed fenestration solar heat gain coefficients (SHGC) in the southern and central climate zones. In a cooling-dominated climate, a lower SHGC will almost always reduce a home's annual energy consumption.

Table 1 below shows the changes in the code's required R-values and U-factors by climate zone. DOE has preliminarily determined that every change in the code's table represents an improvement in efficiency. Table 2 below shows the increase in required thermal resistance for each building component type weighted by climate zone.

For the fenestration U-factor, the code has increased the required thermal resistance by an average of 26.7%. In climate zone 1, Table R402.1.1 appears to revert from a required U-factor of 1.2 to NR (no requirement). This, however, should have no effect on the energy efficiency of the code because the U-factor of a minimally efficient single-pane window meets the requirement of 1.2. Seen in this light, the change to NR is really a clarification, rather than an actual change. The U-factor requirements for skylights in the 2012 IECC would reduce allowable heat loss through skylights an average of 12.6% compared to the 2009 IECC.

For glazed fenestration the allowable solar heat gain coefficient (SHGC) has been lowered, reducing solar heat gain by 17% in the cooling-dominated climate zones (1–3).

Four climate zones (2 through 5) were affected by more stringent insulation requirements in ceilings. Required R-values increased by 27% to 29% in these zones. However, accounting for the thermal bridging effects of typical wood framing members, DOE has preliminarily determined that the changes in the code represent a weighted average increase of 12.2% in the thermal resistance of ceilings.

For wood frame walls, the code allows a choice in some climate zones of a single value for insulation in the

cavity between wall studs, or two values: One for cavity insulation and one for additional continuous insulation applied to the interior or exterior of the wall. Accounting for thermal bridging

effects, and choosing the least thermally resistive of the two options, the 2012 code is estimated to improve thermal resistance of wood-frame walls an average of 13.7%. Mass wall (e.g.,

concrete, concrete block, log) R-value requirements increased by an average of 33.4%. Basement wall and crawl space wall R-values increased by 14.5% and 17.6%, respectively.

**Table 1: Changes in insulation and U-factors for prescriptive (Table R402.1.1) path in the 2012 IECC**

Climate Zone	Fenest. U-Factor	Skylight U-Factor	Glazed Fenest. SHGC	Ceiling R-Value	Wood Frame Wall R-Value	Mass Wall R-Value	Floor R-Value	Basement Wall R-Value	Slab R-Value & Depth	Crawl Wall R-Value
1	<del>1.20</del> 0.50 <sup>a</sup>	0.75	<del>0.3</del> 0.25	30	13	3/4	13	0	0	0
2	<del>0.65</del> 0.40	<del>0.75</del> 0.65	<del>0.3</del> 0.25	<del>30</del> 38	13	4/6	13	0	0	0
3	<del>0.50</del> 0.35	<del>0.65</del> 0.55	<del>0.3</del> 0.25	<del>30</del> 38	<del>13</del> 20 or 13+5	<del>5/8</del> 8/13	19	5/13	0	5/13
4 except Marine	0.35	<del>0.60</del> 0.55	NR 0.40	<del>38</del> 49	<del>13</del> 20 or 13+5	<del>5/10</del> 8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	<del>0.35</del> 0.32	<del>0.60</del> 0.55	NR	<del>38</del> 49	20 or 13+5	13/17	30	<del>10/13</del> 15/19	10, 2 ft	<del>10/13</del> 15/19
6	<del>0.35</del> 0.32	<del>0.60</del> 0.55	NR	49	<del>20</del> or 13+5 20+5 or 13+10	15/19 20	30	15/19	10, 4 ft	<del>10/13</del> 15/19
7 and 8	<del>0.35</del> 0.32	<del>0.60</del> 0.55	NR	49	<del>24</del> 20+5 or 13+10	19/21	38	15/19	10, 4 ft	<del>10/13</del> 15/19

(a) In the prescriptive approach, any fenestration is credited with meeting this requirement.

**TABLE 2—NATIONAL AVERAGE INCREASE IN THERMAL RESISTANCE FOR LOWEST REQUIRED INSULATION LEVEL BY BUILDING COMPONENT**

Building component	Increase in thermal resistance of required insulation (percent)
Fenestration .....	26.7
Skylights .....	12.6
Ceiling .....	18.2
Wood Frame Wall .....	13.7
Mass Wall <sup>1</sup> .....	33.4
Basement Wall <sup>1</sup> .....	14.5
Crawl Space Wall <sup>1</sup> .....	17.6

<sup>1</sup> There are two R-value options in the IECC. The first R-value option is used for this comparison. For mass walls, this first value applies when less than half of the insulation is on the interior of the mass wall, the case for which the code allows a greater reduction in required R-value due to the beneficial effects of thermal mass. The second number is more similar to wood frame wall requirements. For basement and crawl space walls, this first value applies for continuous insulation on the interior or exterior of the wall, whereas the second value is for insulation in cavities between studs or furring strips. In this case the two values represent approximately similar overall thermal resistance.

The 2012 IECC specifies that insulation R-values conform to the requirements of Table R402.1.1 even if the insulation must be compressed to fit within the available cavity. This clause primarily affects some nominal R-19 fiberglass batts that are designed for floor and/or ceiling applications where the available cavity is greater than the 5.5 inches typically available in a 2x6

wall. However, the 2012 edition has no prescriptive requirements that exactly require R-19 in wall cavities, so it is expected that there is no direct impact on energy savings.

**Infiltration Control**

Section 402.4.1.2 contains a new provision for a mandatory whole-house pressure test to determine the envelope air leakage rate (the test was optional in

the 2009 IECC). The maximum allowable air leakage rate is 5 air changes/hour when tested at a pressure difference of 50 Pascals (5 ACH50) in climate zone 1 and climate zone 2; and 3 air changes/hour (3 ACH50) in climate zones 3-8. The 2009 IECC specified a maximum of 7 ACH50 when the optional test was used, or directed the building official to inspect the envelope

against a detailed checklist when the test was not used. The lower allowed leakage rate of the 2012 IECC is expected to save energy, and the mandatory test will likely result in improved energy efficiency in homes that would have had higher leakage rates as a result of leaks that would not be detected by visual inspection.

#### Wall Insulation When Structural Sheathing Is Used

Footnote h to Table R402.1.1 allows certain reductions in the required R-value of continuous insulation on walls that use structural sheathing (e.g., plywood, OSB) for shear bracing. The footnote is relevant only when there is a mixture of structural and insulating sheathing on the wall(s). The 2009 IECC states: "First value is cavity insulation, second is continuous insulation, so "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required in the locations where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2."

The footnote has the effect of suspending the continuous R-value requirement for portions of the wall covered with structural sheathing, provided those portions represent 25% or less of the wall area. If structural sheathing covers more than 25% of the wall, the structural portions must be augmented with additional insulating sheathing of at least R-2. The 2012 IECC states: "First value is cavity insulation, second is continuous insulation, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation. If structural sheathing covers 40 percent or less of the exterior, continuous insulation R-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used—to maintain a consistent total sheathing thickness."

The 2012 IECC allows a larger fraction of the wall (40% rather than 25%) to contain reduced continuous insulation but, unlike the 2009 IECC, does not allow elimination of continuous insulation. The 2012 IECC specifies substantially more continuous insulation layered on top of structural sheathing when the structural fraction exceeds the 40% threshold. It is estimated that the net effect is greater overall efficiency.

#### Ventilation Fan Efficiency

When installed to function as a whole-house ventilation system, the

2012 IECC specifies that mechanical fans meet the following requirements:

- Range Hoods and In-line fans: 2.8 cfm/watt.
- Bathroom (10–90 cfm): 1.4 cfm/watt.
- Bathroom (>90 cfm): 2.8 cfm/watt.

Because the 2012 IECC places upper limits on the energy requirements for these fans where there were no such limits in the 2009 IECC, this change is expected to improve overall efficiency in residences.

#### Lighting

The requirement for high efficacy lamps has been increased from a minimum of 50% of the lamps in permanently-installed fixtures to a minimum of 75%. Further, the high efficacy lamp requirement has been changed from prescriptive to mandatory, meaning the specification cannot be lessened in trade for efficiency improvements elsewhere in the home. This change also addresses an aspect of the 2009 IECC under which the use of high-efficacy lamps is not specified when a building achieved compliance via the simulated performance compliance path. This is expected to improve the energy savings in the 2012 IECC by reducing lighting energy use. The 2012 IECC also added an option for calculating the high-efficacy fraction based on a count of fixtures instead of individual lamps, a change not expected to change overall efficiency.

Section R404.1.1 in the 2012 IECC contains a new provision that bans continuously burning pilot lights on fuel-fired lighting. While the potential energy savings are limited due to the fringe application of this type of lighting, where applied, this rule would tend to increase energy savings by cutting standby energy use of the pilot light.

#### Air Distribution System

There are three key changes to requirements for air distribution systems that improve energy efficiency:

- A change to section R403.2.2.1 that places a limit on air leakage from air handlers. The change is to ensure that the air handler delivers the vast majority of the supply air downstream to the rest of the distribution system.
- Section R403.2.2 reduces maximum allowable levels of duct leakage in the distribution system compared to the 2009 IECC (from 12 cfm per 100 ft<sup>2</sup> of conditioned floor area to 4 cfm/100 ft<sup>2</sup> for tests done on completed buildings, and from 6 to 4 cfm per 100 ft<sup>2</sup> for tests done at the rough-in stage of construction).

- Section R403.2.3 now specifies that building framing cavities may not be used as supply ducts or plenums, which would eliminate the potential for air leaks into adjacent framing cavities and/or attics, crawlspaces, or unheated basements. This may also lessen the chance of an unbalanced distribution system.

DOE has preliminarily determined that all of these changes will increase the energy savings of the 2012 edition of the IECC by delivering more of the conditioned air to where it is needed via a more efficient distribution system.

#### Hot Water Pipe Insulation and Length Requirements

Section R403.4.2 contains new specifications for noncirculating service hot water distribution systems that should reduce energy losses from "stranded" hot water and conduction of heat out of the pipes. The 2012 IECC specifies that all such pipes to be insulated unless they have sufficiently low volume as defined by a combination of their length (measured from the tank or distribution manifold to the point of use) and diameter. This change is expected to reduce the amount of hot water that cools off in the pipes and is thus wasted as users wait for sufficiently warm water to reach the fixture. Also, for circulating hot water systems, the required insulation has been increased from R-2 to R-3 and therefore should increase efficiency. A final change in the 2012 IECC requires that piping insulation be protected from the elements. Although primarily a durability concern, this change may save energy by reducing the incidence of damaged and/or missing insulation.

#### Skylight Definition Change

Previously, skylights were defined as any glazed fenestration at less than 75 degrees from horizontal. That definition has been changed in the 2012 IECC to be less than 60 degrees from horizontal. The effect of this change is to classify more glazing as vertical fenestration rather than skylights. Although the number of skylights in this slope range is small, because the U-factor requirements for vertical fenestration are more stringent than for skylights, this change is expected to improve the energy savings of the 2012 IECC.

#### Electric Resistance Heating in the Performance Path

Under the performance compliance path (Section R405), the 2012 IECC has modified the reference design for buildings with electric heating systems that do not use a heat pump, requiring that a heat pump be assumed in the

standard reference design. Because of the efficiency of heat pumps as compared to other electric heating technologies, this code change is expected to increase the energy efficiency of the reference design, which would have the effect of specifying that the proposed design to be more energy efficient if it is to comply via this section and the proposed design has an electric heating system that is less efficient than a heat pump. Although this affects only homes with electric resistance heating, its effect is expected to be an improvement in efficiency if such homes comply via the performance method.

**Fireplace Air Leakage Control**

The 2012 IECC specifies that all fireplaces have tight-fitting flue dampers and gasketed doors (the 2009 IECC requires such only for wood-burning fireplaces). This is expected to result in very air-tight fireplaces which would improve a home's air leakage characteristics. Therefore, this is deemed an improvement in efficiency for homes with fireplaces.

**In-Ground Hot Tubs and Spas**

Section R403.9 has been updated to include in-ground hot tubs and spas under the purview of the code, where previously only swimming pools were included. The change effectively requires hot tubs and spas to have insulating covers, which should lower energy losses. To the extent that these devices typically already have insulating covers this may have limited impact in terms of efficiency.

The 2012 IECC now specifies that log walls meet the requirements of ICC-400, a separate standard for log wall construction. Although this does not

change the thermal requirements, it may result in better quality construction of log walls, which would improve energy performance by reducing air leaks and thermal bypasses.

**Baffles for Attic Insulation**

Section R402.2.3 now requires a wind wash baffle for vented attics. For air-permeable insulation, this should improve the effective insulation value of the ceiling by reducing wind-driven air movement and may in some cases prevent blown-in insulation from being displaced by wind. Therefore, this is an improvement in efficiency for attics.

*B. Changes in the 2012 IECC That Are Estimated To Decrease Energy Efficiency*

**Steel-Frame Wall Insulation**

The 2012 IECC modifies the IECC code's tables of steel-framed wall U-factor equivalences with wood-frame walls of various R-values in such a way that less efficient steel-framed walls will be deemed equivalent to a corresponding wood-frame wall in many cases. In the 2009 IECC, there was no distinction between homes with different steel stud spacing. In the 2012 IECC, there are now separate U-factor equivalences for studs with 16" and 24" spacing. The 16" stud spacing requirements have two categories that are directly comparable to the 2009 IECC requirements: walls with wood-frame R-values of R-13 or R-21. According to Table A3.3 of ASHRAE 90.1 2007, the 2009 IECC-required R-factors represent an equivalent U-factor for the wall assembly of 0.077 to 0.080 Btu/hr-ft<sup>2</sup>-F, depending on the compliance option. This has been changed in the 2012 IECC to a range of 0.059–0.089 Btu/hr-ft<sup>2</sup>-F. The average

compliance option based on R-13 wood-frame walls represents a 5.4% higher U-factor. For R-21 wood-frame walls, the steel frame options previously represented U-factors of 0.054, whereas in the 2012 code, they represent U-factors of 0.056, a 3.1% increase.

Insulation equivalences in the 2012 IECC for steel walls with 24" stud spacing are slightly more lax, reflecting the decreased thermal bridging effects, compared with 16" stud spacing. Because the baseline for comparison for 24" stud spacing in the 2009 IECC is still the general requirements that did not distinguish based on stud spacing, these new requirements represent higher increases in assembly U-factors than for 16" stud spacing. Specifically, there is a 9.1% increase in assembly U-factors among the various insulation options for R-13 and an 11.8% increase for R-21. The steel-wood framing equivalences of the 2009 IECC and the 2012 IECC are compared below in Table 3. In this table, the first value is cavity insulation and the second is continuous insulation. For example, R-13+5 is R-13 cavity insulation plus R-5 continuous insulation.

Note that while the steel/wood equivalences have changed such that steel-stud walls may be less efficient than before in comparison to a particular wood-frame R-value, the base R-value requirements (expressed in terms of wood-frame walls) have substantially increased in climate zones 3, 4, 6, 7, and 8 which would result in energy savings in these zones even for steel framed walls. Because the number of homes with external walls with steel framing is small compared to wood-frame homes, this change is not expected to result in substantial overall efficiency losses in zones 1, 2, and 5.

TABLE 3—COMPARISON OF STEEL-FRAME WALL REQUIREMENTS BETWEEN THE 2009 AND 2012 IECC

Steel frame spacing .....	16" stud spacing		24" stud spacing	
	Wood-Frame Requirement .....	R-13	R-21	R-13
2009 IECC Options .....	R-0+10 or R13+5 or R-15+4 or R-21+3	R-13+10 or R-19+9 or R-25+8	R-13+5 or R-15+4 or R-21+3 or R-0+10	R-13+10 or R-19+9 or R-25+8
2012 IECC Options .....	R-0+9.3 or R-13+4.2 or R-15+3.8 or R-19+2.1 or R-21+2.8	R-0+14.6 or R-13+9.5 or R-15+9.1 or R-19+8.4 or R-21+8.1 or R-25+7.7	R-0+9.3 or R-13+3 or R-15+2.4	R-0+14 or R-13+8.3 or R-15+7.7 or R-19+6.9 or R-21+6.5 or R-25+5.9
Average U-factor (2009) <sup>1</sup> .....	0.079	0.054	0.063	0.04
Average U-factor (2012) .....	0.083	0.056	0.07	0.045
Average U-factor Increase .....	5.4%	3.1%	9.1%	11.8%

<sup>1</sup> Calculated using ASHRAE 90.1–2007 Table A3.4.

**Air Barrier Location**

The 2012 IECC changes Table R402.4.1.1 by removing a requirement that air-permeable insulation be located inside the air barrier, allowing the insulation to be outside of the air barrier in the exterior envelope construction. By allowing air-permeable insulation to be located outside the air barrier this change may result in increased levels of outdoor air infiltration in the interstices of the insulation material. This would tend to reduce the effectiveness of the insulation. The magnitude of impact for this change, however, is expected to be minimal because an interior air barrier will still be effective at reducing air movement through the envelope and because the 2012 IECC's new mandate for a whole-house pressure test will ensure that total air leakage through the building envelope be kept at a low rate.

There is an additional change in the 2012 IECC that may reduce the energy efficiency of the code. In the 2009 IECC, the common wall between dwelling units of a multifamily or two-family structure was required to be air-sealed. In the 2012 IECC, this requirement has been removed. In practice, these common walls can provide a route for air leakage to the outdoors if they are coupled to attics, basements,

crawlspaces, or other unconditioned spaces. Because multifamily represent a small fraction of low-rise residential dwelling units (about 15%) and because this change creates the potential for only an indirect air movement path, DOE does not consider this change to be significant.

*C. Changes in the 2012 IECC That Have an Unclear Impact on Energy Efficiency*

**Fenestration SHGC in Climate Zone 4**

As presented in Table 1, the 2012 IECC changes SHGC specifications for climate zone 4 from no requirement (NR) to 0.4. Because climate zone 4 contains locations where the energy savings from increased solar heat gains in winter may more than offset increased energy use for air conditioning in summer, it is possible that a lower SHGC would increase energy use in some parts of the zone. However, the specified fenestration U-factor of 0.35 in both the 2009 and 2012 IECC usually implies the use of windows with low-emissivity coatings that have an SHGC of 0.4 or below even in the absence of a specific SHGC requirement. Therefore, DOE expects this change to have minimal impact either in terms of energy savings or energy losses.

**Interior Shading Assumptions in the Performance Compliance Path**

The 2012 IECC modifies internal shade fractions required as inputs to the performance compliance path. The 2009 IECC specified the following internal shade fractions for the reference design: Summer—0.70, Winter—0.85. These have been replaced in the 2012 IECC with the following equation for calculating interior shade fraction (ISF):

$$ISF = 0.92 - 0.21 \cdot SHGC$$

The impact of this change on the energy consumption of homes complying via the performance path is nuanced and difficult to generalize, but is expected to be small. Its primary impact is to modestly change the relative importance of cooling- and heating-oriented energy-saving features.

*D. Changes in the 2012 IECC That Do Not Affect Energy Efficiency*

Several changes were made to the IECC that do not directly affect energy efficiency. Table 4 details these changes, listing the section of the 2009 IECC to which the change was made, a description of the change, and an explanation why overall energy efficiency is not affected.

**TABLE 4—CHANGES TO IECC THAT DO NOT EFFECT ENERGY EFFICIENCY**

Code Section	Change	Comments
R202 .....	Clarifies that residential buildings covered by chapter 4 are one- and two-family dwellings, townhouses and multi-family residential (R-2) not over 3 stories in height above grade.	This change is only a clarification.
R202 .....	Definition of a whole-house ventilation system .....	Because whole-house ventilation systems are not yet required by the code, this new definition effects no real change to the code's requirements.
R401.3 .....	Results of an air leakage test must be documented on the certificate	This change only affects the transparency of code compliance.
R202 and R303.1.3 .....	Introduction of "Visible Transmittance"(VT) for fenestrations. Default "Visible Transmittances" defined in Table.	The table only provides default VT values for certain window types. VT is not directly regulated by the code.
R402.4.4 .....	Clarification that recessed lighting must be labeled as having a leakage rate to ceiling cavity of <= 2 cfm.	This is only a clarification of previous text.
Chapter 6 .....	Introduction of ASHRAE test procedure 193 for determining the air leakage rate for HVAC Equipment.	Provides a test procedure to enable compliance with a new requirement.
Chapter 5 .....	Introduction of test standard for home ventilation systems: HVI 916–09 Airflow Test Procedure.	Provides a test procedure to enable compliance with a new requirement.
Table R405.5.2(1) .....	Requirements for Proposed Design for Thermal Distribution Systems: Thermal distribution system efficiency shall be as tested or as specified by Table 405.5.2 if not tested. Duct insulation shall be as proposed.	This change is only a clarification.
R403.6 .....	Heating and cooling equipment shall be sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies.	This moves this requirement directly into the IECC instead of referencing the IRC.

### III. Filing Certification Statements With DOE

#### A. State Determinations

If today's determination is finalized, each State would be required to determine the appropriateness of revising the portion of its residential building code regarding energy efficiency to meet or exceed the energy efficiency provisions of the 2012 IECC. (42 U.S.C. 6833(a)(5)(B)) Note that the applicability of any State revisions to new or existing buildings would be governed by the State building codes. However, it is our understanding that generally, the revisions would not apply to existing buildings unless they are undergoing a change that requires a building permit. The determinations are required to be made not later than two years from the date of publication of a notice of final determination, unless an extension is provided. The State determination must be: (1) Made after public notice and hearing; (2) in writing; (3) based upon findings and upon the evidence presented at the hearing; and (4) made available to the public. States have considerable discretion with regard to the hearing procedures they use, subject to providing an adequate opportunity for members of the public to be heard and to present relevant information. The Department recommends publication of any notice of public hearing in a newspaper of general circulation.

Section 304(a)(4) of ECPA, as amended, requires that if a State makes a determination that it is not appropriate to revise the energy efficiency provisions of its residential building code, the State must submit to the Secretary, in writing, the reasons for this determination and the statement shall be available to the public. (42 U.S.C. 6833(a)(4))

States should be aware that, consistent with IECC definitions, the Department considers high-rise (greater than three stories) multifamily residential buildings and hotel, motel, and other transient residential building types of any height as non-residential buildings for energy code purposes. 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.

States should also be aware that this preliminary determination does not apply to IECC chapters specific to non-residential buildings as defined above. Therefore, if today's action is finalized then States must certify their

evaluations of their State building codes for residential buildings with respect to all provisions of the IECC except for those chapters.

#### B. Requests for Extensions To Certify

Section 304(c) of ECPA, as amended, 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; and/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.

### IV. Regulatory Analysis

#### A. Review Under Executive Order 12866

Today's action is not a significant regulatory action under section 3(f)(1) of Executive Order 12866, "Regulatory Planning and Review" (58 FR 51735 (Oct. 4, 1993)). Accordingly, today's action was not subject to review 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 (Aug. 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>. If today's action on the preliminary determination of improved energy efficiency between IECC editions is finalized it would require States to undertake an analysis of their respective building codes. Today's action does not

impact small entities. Therefore, DOE has preliminarily certified that there is no significant economic impact on a substantial number of small entities.

#### 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 impacts whether States must perform an evaluation of State building codes. The action would not 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 (Aug. 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 examined today's action and has determined that it will not pre-empt State law and will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Today's action impacts whether States must perform an evaluation of State building codes. No further action is required by Executive Order 13132.

#### F. 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.

Today's action impacts whether States must perform an evaluation of State building codes. Today's action would not impose a Federal mandate on State, local or Tribal governments, and it would not result in the expenditure by State, local, and Tribal governments in the aggregate, or by the private sector, of \$100 million or more in any one year. Accordingly, no assessment or analysis is required under the Unfunded Mandates Reform Act of 1995.

#### *G. 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 preliminarily concluded that it is not necessary to prepare a Family Policymaking Assessment.

#### *H. 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 (Feb. 22, 2002), and DOE's guidelines were published at 67 FR 62446 (Oct. 7, 2002). DOE has reviewed today's action under the OMB and DOE guidelines and has preliminarily concluded that it is consistent with applicable policies in those guidelines.

#### *I. 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.

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

Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments" (65 FR 67249 (Nov. 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.

#### **V. Public Participation**

The public is invited to submit comments on the preliminary determinations. Comments must be provided by the date specified in the **DATES** section of this notice 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.

Issued in Washington, DC on October 13, 2011.

**Henry Kelly,**

*Acting Assistant Secretary, Energy Efficiency and Renewable Energy.*

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**BILLING CODE 6450-01-P**

#### **DEPARTMENT OF ENERGY**

#### **Office of Energy Efficiency and Renewable Energy**

**[Docket No. EERE-2011-BT-BC-0046]**

#### **Building Energy Codes Cost Analysis**

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

**ACTION:** Notice of reopening the public comment period.

**SUMMARY:** This notice announces a reopening of the time period for submitting comments on the request for information on Building Energy Codes Cost Analysis published in the **Federal Register** on September 13, 2011. 76 FR 56413. The original comment period closed on October 13, 2011. The comment period is reopened for an additional 30 days.

**DATES:** Comments must be received no later than November 18, 2011.

**ADDRESSES:** Any comments submitted must identify the request for information on Building Energy Code Cost Analysis and provide docket number EERE-2011-BT-BC-0046. Comments may be submitted using any of the following methods:

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

- *E-mail:* [Res-CEAM-2011-BC-0046@ee.doe.gov](mailto:Res-CEAM-2011-BC-0046@ee.doe.gov). Include EERE-2011-BT-BC-0046 in the subject line of the message. Submit electronic comments in WordPerfect, Microsoft Word, PDF, or ASCII file format and avoid the use of special characters or any form of encryption.

- *Postal Mail:* Ms. Brenda Edwards, U.S. Department of Energy, Building