
May 9, 2013

VIA E-MAIL

Anthony Clatterbuck, Chairman
Virginia Board of Housing and Community Development
600 East Main Street, Suite 300
Richmond, VA 23219

RE: RECA Comments Supporting the Adoption of the 2012 *IECC* in Virginia

Dear Mr. Clatterbuck,

The Responsible Energy Codes Alliance¹ submits the following comments to support updating Virginia's building energy code to the 2012 *International Energy Conservation Code (IECC)*. We also specifically address the problems created by several proposed weakening amendments submitted to the DHCD Workgroups and recommended by the Codes and Standards Committee at its March 25, 2013 meeting.

RECA supports the adoption of the 2012 *IECC* and *International Residential Code (IRC)* Chapter 11 as the energy conservation requirements for all buildings in Virginia. However, we strongly oppose significant weakening amendments like the amendments detailed below that will substantially reduce the energy savings, and ultimately the long-term cost savings for Virginia homeowners.

The following amendments are simply not in the public interest and should be rejected by the Board:

- **Reductions in wood-frame wall insulation values** (VCC *IRC* N1102.1.1, VCC *IECC* TR 402.1.1, and VCC *IECC* R402.1.1)
- **Amendments to testing requirements for whole house air leakage and duct tightness** (VCC *IRC* N1102.4 and VCC *IECC* R403.2.2)

¹ The Responsible Energy Codes Alliance is a broad coalition of energy efficiency professionals, regional organizations, product and equipment manufacturers, trade associations, and environmental organizations that promote the adoption and implementation of improved building energy codes and, in particular, the most recent version of the *IECC* nationwide. A list of RECA members is enclosed at the end of this letter. RECA members have been involved in the development of the *IRC* and *IECC*, and the implementation of these codes in jurisdictions across the country for two decades.

- **Changes to glazing area assumption in performance path** (VCC *IECC* R405.5.2(1))
- **Weaker ceiling insulation values** (VCC *IRC* N1102.1.3)
- **Reduced requirements for efficient lighting** (VCC *IECC* R404.1)
- **Elimination of efficiency requirements for replacement fenestration** (VCC *IECC* R402.3.6)

All of these amendments, which are addressed in more detail below, will reduce the effectiveness of the 2012 *IRC* and *IECC*, and in several cases will weaken the current Virginia USBC energy conservation requirements. We urge the Board of Housing and Community Development to adopt the 2012 *IECC* and *IRC* with no weakening amendments and to maintain the Virginia's standing as a national leader in sensible and efficient building practices and the effective use of energy.

1. RECA's Support for Adoption of the 2012 *IECC* and *IRC*

By implementing and enforcing the 2012 *IECC* and *IRC*, Virginia will help ensure that every buyer of a new home gets a reasonably energy efficient and affordable home, and that commercial buildings will operate more efficiently and receive the benefits of a modern, energy efficient building.

The 2012 *IECC* is the final product of a consensus-based, long-standing model code development process by the International Code Council that involves the nation's leading experts in energy efficiency, building design and product performance, state and local governmental officials, manufacturers, architects and builders. The final version of the 2012 *IECC* is the result of votes by interested governmental officials from across the nation, including a strong delegation from Virginia. Virginia and its citizens stand to benefit from the adoption of the 2012 *IECC* in many ways:

- According to the United States Department of Energy (U.S. DOE), the 2012 *IECC* "represents the largest, one-step efficiency increase in the history of the national model energy code."² **In fact, the U.S. DOE found that the 2012 *IECC*, as published, represents a whopping 27.4% improvement in energy savings over the current energy code in Virginia.**³
- The U.S. DOE also found that the incremental costs of building homes to the 2012 *IECC* in Virginia will be quickly repaid by energy cost savings. For the typical Virginia

² See "2012 *IECC* Final Action Hearings Deliver DOE's 30% Energy Savings Goals," at http://www.energycodes.gov/status/2012_Final.stm.

³ See *Virginia Energy and Cost Savings for New Single- and Multifamily Homes: 2012 *IECC* as Compared to the 2009 Virginia Construction Code*, A.8, at http://www.energycodes.gov/development/residential/IECC_analysis/.

home, the increase in mortgage costs will be outweighed by utility bill savings within 1 year (resulting in a net positive cash flow), and these homes will produce a **net savings of \$5,836 over the first 30 years of the home's lifetime**.⁴ A copy of the U.S. DOE analysis is attached to these comments.

- By adopting the 2012 *IECC*, the Commonwealth will meet both state and federal statutory requirements⁵, will stay on track with state energy efficiency goals, and will provide benefits to the state and to building and home owners for many years. In particular, new construction is by far the most cost-effective time to install good building envelope measures such as sufficient insulation, quality windows and doors, and tight homes and ducts.

2. RECA's Opposition to Specific Weakening Amendments that Would Eliminate Substantial Energy and Cost Savings for Virginia Homeowners and Businesses

A. Wood-Frame Wall Insulation Values (VCC *IRC* N1102.1.1, VCC *IECC* TR 402.1.1, and VCC *IECC* R402.1.1)

Two proposals submitted to the Work Groups would reduce the wood-frame wall insulation values from the 2012 *IECC/IRC* prescriptive requirements⁶ of R-20 or 13+5 to a substantially less efficient R-13 or R-15. Although a third proposal recommended R-18 or 15+3 (closer to the 2012 values), it appears that the Codes and Standards Committee has recommended approving the least efficient of all these proposals – R-13.

These proposals all suffer from the same problem: **Reducing wall insulation requirements sacrifices long-term homeowner energy savings and other benefits for short-term builder cost-cutting and profit**. Wall insulation is most cost-effective at initial construction and will produce benefits over the lifetime of the building. There is one real opportunity to properly insulate walls in residential buildings that may last for 70 or 100 years, and that is when the home is built. For an incremental upgrade cost at construction, well-insulated walls will provide comfort and energy savings over that entire lifetime.

The most important question for a homeowner is how much the homeowner could gain or lose in energy and cost savings every month over the lifetime of the home. ICF

⁴ *Id.* at 3.

⁵ The Department of Energy recently issued its determination on the 2012 *IECC* as required by federal law and confirmed it as the new baseline for state residential energy codes, directing all states to certify that they have reviewed and considered adopting it. *See 77 Fed. Reg. 29322* (May 17, 2012).

⁶ R-values such as "R-13+5" refer to cavity insulation plus insulated sheathing. Thus, a requirement for R-20 or 13+5 means wall assemblies could be built with R-20 cavity insulation or R-13 cavity plus R-5 insulated sheathing.

International recently modeled homes in Virginia’s climate zone to analyze the impact of a reduction from the 2012 *IECC* wall insulation values (R-20 or 13+5) to R-15. This is a reduction in wall insulation by almost 18%, and a home built with R-15 insulated walls would be, on average, 6.2% less efficient overall than a home built to the 2012 *IECC* requirements. **That difference alone could cost Virginia homeowners an average of \$1,777 more in energy costs over a 30-year period, and \$2,962 over a 50-year period.**

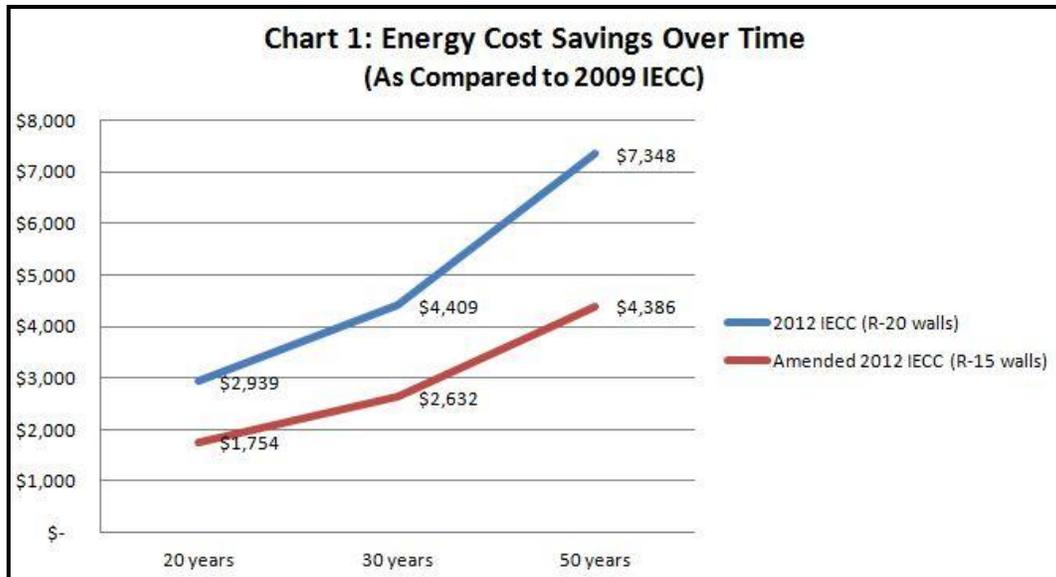


Chart 1 shows the lifetime energy cost savings modeled for two types of homes: The top line represents a home built to the 2012 *IECC* requirements (including R-20 wall insulation), and the bottom line represents a home built to the 2012 *IECC* with weaker insulation (R-15). Obviously, the impact of allowing R-13 walls would reduce the savings even further. We urge the DHCD to maintain the improvements to wall insulation requirements contained in the 2012 *IECC* and *IRC* and ensure homeowner energy and cost savings over the lifetime of the home.

B. Air Leakage Testing and Duct Tightness Testing (VCC *IRC* N1102.4 and VCC *IECC* R403.2.2)

The 2012 *IECC* substantially improved the standards for whole house air tightness and duct tightness. Tighter homes are more energy efficient in all seasons, and tighter ducts help to ensure that conditioned air is delivered efficiently to all the appropriate places in the building without substantial leakage and waste of conditioned air. The best way to verify that buildings and duct systems are sufficiently tight is to apply an objective test. The 2012 *IECC* requires that duct systems be tested to a total leakage rate of less than or equal to 4cfm, or in the alternative, that all ducts and air handlers are located inside conditioned space

(thereby at least keeping leaking conditioned air in the occupant space). Homes must also be tested to an overall air leakage rate of no more than 3 air changes per hour in Virginia's climate zone. **The amount of air leaking out of duct systems or through the thermal envelope simply cannot be estimated or verified without testing.** Under the 2012 *IECC*, the building official has the discretion to either allow a builder to test both air leakage and duct leakage and provide the results, or the building official may require third-party testing.

The testing requirements are objective and accurate, and will provide useful information to both the builder and the homeowner about a key component of the home's long-term efficiency. These tests can reduce the likelihood of builder callbacks and can help ensure that heating and cooling systems operate as efficiently as intended. The cost of conducting these tests is relatively low considering the impact on efficiency. We encourage the DHCD to maintain both testing requirements at the levels specified in the 2012 *IECC*.

C. Glazing Area Assumption in Performance Path (VCC *IECC* R405.5.2(1))

The March 25, 2013 Summary of CSC Actions notes that a nonconsensus proposal to alter the glazing area assumption in the performance path Table R405.5.2(1) has been recommended "As Submitted." This represents not only a weakening amendment to the 2012 *IECC*, but also **a weakening amendment to Virginia's current code requirements, and we urge the DHCD to reject it.**

Virginia's current performance path and the 2012 *IECC* performance path contain a glazing area assumption with two important backstops – one for homes with below-average glazing area and one for above-average glazing area – that help ensure the use of efficient windows in all buildings.

- **Low glazing area (15% of conditioned floor area and below).** Where the proposed home design has lower than average glazing area, the proposed home is compared against a standard reference design home with the same glazing area percentage. In other words, a proposed home with 12% glazing area must achieve the same energy efficiency as a standard reference home with 12% glazing area. This approach ensures that there is no unwarranted trade-off loophole created by those homes that have lower-than-average glazing area that would allow trading away other efficiencies of the thermal envelope, such as wall insulation. Common examples of homes with low glazing area include townhouses, condos, multifamily buildings, or low-income housing.
- **High glazing area (over 15% of conditioned floor area).** For homes with above-average glazing area, the proposed home is compared against a standard reference design with 15% glazing – essentially requiring that homes with lots of windows must achieve the same overall efficiency as an average home with 15% glazing.

The net effect of these two assumptions is that all homes, whether they have high or low glazing area percentages, will have reasonably efficient windows and insulation. To set the glazing area assumption at a fixed 15% would likely lead to weaker thermal envelopes – particularly in homes with low glazing area, including multi-family housing that may be targeted to low-income populations.

It is important to note that the current dynamic approach to setting the glazing area assumption has been consistently applied by Virginia and other states since the development of and adoption of the 2006 *IECC*. **Currently there are 32 states, including Virginia, that have either adopted the 2009 or 2012 *IECC*, and not a single one of these states has set the glazing area assumption at a flat 15% (or any fixed percentage) as proposed here.** This proposal would create a huge energy efficiency loophole and huge step backward, and would result in a substantial and unnecessary loss in energy and cost savings for Virginians. We urge the DHCD to reject this amendment.

D. Ceiling Insulation Values (VCC IRC N1102.1.3)

The additional ceiling insulation required by the 2012 *IECC* is most cost-effective when installed at initial construction, when equipment and laborers are already present. The only question is whether to install an additional amount of insulation in the attic (basically another 3.5 inches of blown-in insulation). The R-49 insulated attic will save 1.6% more energy than the R-38 attic, every year over the 70-100 year expected lifetime of the home. The U.S. Department of Energy has found that ceiling insulation between R-38 and R-60 is cost-effective in Virginia's climate zone,⁷ and R-49 is well within that range.

E. Lighting Requirements (VCC *IECC* R404.1)

The 2012 *IECC* increases the high-efficacy lighting requirement from 50% of bulbs to 75%. This proposal was supported by a broad group of stakeholders at the ICC, including the National Association of Homebuilders. However, the Codes and Standards Committee has recommended leaving the requirement at 50%.

Efficient lighting is cost-effective and simple. According to the U.S. Department of Energy, lighting accounts for about 15% of the energy use in an average home.⁸ A switch from 50% to 75% high-efficacy lighting will save a significant amount of energy -- CFLs can use 75% less energy and produce 75% less heat than incandescent bulbs. While initial costs are slightly higher than for incandescent bulbs, CFLs can last much longer. The price of CFLs has dropped dramatically in recent years, and will continue to do so as the market matures.

⁷ See <http://energy.gov/energysaver/articles/tips-insulation>

⁸ See http://energy.gov/sites/prod/files/guide_to_energy_efficient_lighting.pdf

Today's CFLs are very cost-effective. In fact, *Consumer Reports* found that replacing one 60W incandescent bulb with a 13W CFL could save over \$57 over the life of the CFL.⁹ CFLs and other high-efficacy bulbs can be used in a variety of settings, and now include dimmable bulbs, flood lights, and bulbs suitable for chandeliers. We encourage the DHCD to maintain the 75% efficient lighting requirement in the 2012 *IECC*.

F. Replacement Fenestration (VCC IECC R402.3.6)¹⁰

Although it is not clear whether the Board will address the efficiency requirements for replacement fenestration at its May 20th meeting, replacement fenestration efficiency should be very high on the Board's list of priorities. Replacement fenestration is currently required to meet the same requirements as windows used in new construction in the 2009 Virginia USBC. Removing this requirement, as has been proposed in earlier Work Group meetings, would significantly weaken the efficiency of renovations and additions and constitute a major step backward in energy efficiency. This requirement has been in the *IECC* since the 1990s, and it is routinely applied in states around the country. Even if permits are not required in Virginia for all replacement window projects, this does not mean that the energy code does not still apply; while not all laws may be enforced all of the time, the mere existence of the law will have a positive effect on energy efficiency. Retailers and suppliers take their cues from the energy code, and having an efficiency requirement in the energy code helps to transform the market for energy-efficient products.

The scope of the *IECC* requirement for replacement windows is significant: Replacement fenestration accounts for most of the residential windows sold in Virginia. There are currently very few opportunities to improve the energy efficiency of existing buildings; replacement fenestration is one outstanding opportunity. Efficient windows do not take up any more space or require building redesign, and the initial cost difference between an inefficient and an efficient window will be very small, particularly as compared with the base cost of the product and installation. But the savings impact on homeowners and the statewide impact of reducing the need for additional power generation can be substantial.

Although some stakeholders have expressed concern about a potential conflict between Section 103.5(4) and Section 402.3.6, we note that both sections exist and are

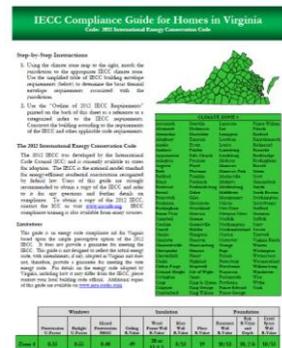
⁹ <http://news.consumerreports.org/home/2010/03/save-money-by-using-cfls-energy-star-qualified-compact-fluorescents-cfl-review-consumer-reports.html>

¹⁰ This amendment was recommended "As Submitted" at the December 20, 2012 meeting of the Codes and Standards Committee, but it is not clear whether the Board has addressed the issue yet. See <http://www.dhcd.virginia.gov/images/SBC/codechangecycle/Codes-and-Standards-Committee-SummaryActions-Dec20-2012.pdf>.

enforced in the current version of Virginia’s USBC. In the interpretation of statutes and regulations, there is a presumption that the more specific and more stringent language trumps the less specific or less stringent. 2009 USBC section R103.5 (4) states that “Material or equipment, or both, may be replaced in the same location with material or equipment of a similar kind or capacity.” But the more specific requirement, in the 2009 USBC Sections 402.3.6 and N1102.3.6, specifies that “Where some or all of an existing fenestration unit is replaced with a new fenestration product, including sash and glazing, the replacement fenestration unit shall meet the applicable requirements for U-factor and solar heat gain coefficient (SHGC) in [the prescriptive table].” The more specific and more stringent language of R402.3.6 trumps the less specific, less stringent language of 103.5(4) for replacement windows only. Given the potential energy losses associated with allowing most of the residential windows sold in Virginia to be something less than what the code requires for new construction, we urge the Board to keep sections 402.3.6 and N1102.3.6 in the 2012 edition of the USBC.

2012 IECC Builder Compliance Guides

As with previous generations of the *IECC*, RECA has created a one-page simple reference guide for the key elements of the 2012 *IECC*. The 2009 version of the RECA guides has been used in Virginia for code compliance and training purposes for several years. A copy of a 2012 *IECC* guide for Virginia is attached to this submission, and additional copies can be downloaded or printed free of charge from our website, www.reca-codes.com. Hard copies can also be customized for Virginia’s training and compliance needs. Please contact RECA directly for more information.



Conclusion

RECA strongly supports the adoption of the 2012 *IRC* and *IECC* by the Commonwealth of Virginia, and we offer our assistance and experience in energy code adoption and implementation to you as you work to maximize building energy efficiency. We hope that you will not hesitate to draw on RECA's support and willingness to help. Please contact me at (202) 339-6366 if you have any questions or would like to discuss how RECA can be of assistance.

Sincerely,

Eric Lacey
Chairman

RECA is a broad coalition of energy efficiency professionals, regional organizations, product and equipment manufacturers, trade associations, and environmental organizations with expertise in the adoption, implementation and enforcement of building energy codes nationwide. RECA is dedicated to improving the energy efficiency of homes in Virginia and throughout the U.S. through greater use of energy efficient practices and building products. It is administered by the Alliance to Save Energy, a non-profit coalition of business, government, environmental and consumer leaders that supports energy efficiency as a cost-effective energy resource under existing market conditions and advocates energy-efficiency policies that minimize costs to society and individual consumers. Below is a list of RECA Members that endorse these comments.

Air Barrier Association of America

Alliance to Save Energy

American Chemistry Council

American Council for an Energy-Efficient Economy

Cardinal Glass Industries, Inc.

CertainTeed Corporation

EPS Molders Association

Extruded Polystyrene Foam Association

Guardian Industries Corporation

Institute for Market Transformation

Johns Manville Corporation

Knauf Insulation

National Fenestration Rating Council

North American Insulation Manufacturers Association

Owens Corning

Pactiv Corporation

Polyisocyanurate Insulation Manufacturers Association

Sierra Club