RE151-19

IECC: R405.2 (IRC N1105.2) , ICC Chapter 6 (IRC Chapter 44)

Proposed Change as Submitted

Proponents: William Fay, Energy-Efficient Codes Coalition, representing Energy-Efficient Codes Coalition (bfay@ase.org); Daniel Bresette, Alliance to Save Energy, representing Alliance to Save Energy (dbresette@ase.org); Maureen Guttman, BCAP-IBTS, representing BCAP-IBTS (mguttman@bcapcodes.org); Harry Misuriello, representing American Council for an Energy-Efficient Economy (misuriello@verizon.net)

2018 International Energy Conservation Code

Revise as follows:

R405.2 (IRC N1105.2) Mandatory requirements. Compliance with this section requires that the mandatory provisions identified in Section R401.2 be met. The *building thermal envelope* shall be greater than or equal to levels of efficiency and *Solar Heat Gain Coefficients* in Table R402.1.1 or R402.1.3 of the 2009 *International Energy Conservation Code* . Supply and return ducts not completely inside the *building thermal envelope* shall be insulated to an *R*-value of not less than R-6.

Add new text as follows:

ICC

International Code Council, Inc.
500 New Jersey Avenue NW 6th Floor
Washington DC 20001

IECC-2009: International Energy Conservation Code

Reason: The purpose of this code change is to help ensure long-term energy savings and occupant comfort by applying a reasonable, consistent minimum mandatory thermal envelope backstop across the IECC's two performance-based compliance paths. Since 2015, the newest IECC compliance path, the Energy Rating Index (R406), has already included a minimum mandatory thermal envelope backstop based on the 2009 IECC prescriptive requirements. While a minimum backstop is most important for the ERI, it would also be useful if applied to the simulated performance alternative in Section R405. This proposal will accomplish this objective.

An important part of the logic behind the minimum thermal envelope requirements for the ERI applies to the performance path in Section R405 as well -- a well-built thermal envelope provides long-term energy savings and improved comfort for occupants over the lifetime of the home, and upgrades to the thermal envelope are easiest to incorporate (and most cost-effective) at construction. This is consistent with the intent of the IECC set forth in Section R101.3. Specifically, the IECC is intended to "regulate the design and construction of buildings for the effective use and conservation of energy over the useful life of each building." Regardless of the compliance option selected by the code user, the IECC should require a reasonable minimum level of performance by the home's permanent thermal envelope. As a result, this proposal would apply the same minimum mandatory requirements, including envelope requirements, to Section R405 compliance as currently apply to Section R406 compliance.

To our knowledge, the 2009 IECC backstop in Section R406.2 has been adopted by every state that has adopted the ERI as part of the 2015 or 2018 IECC. A trade-off backstop recognizes the crucial importance of a reasonably efficient thermal envelope, irrespective of the efficiency tradeoffs among various other building components. While we would prefer an even more robust backstop than the 2009 prescriptive requirements (such as the 2015 requirements, which were established in 2018 for ERI compliance that includes on-site generation), the 2009 requirements are at least a reasonable starting place and are consistent with the current backstop for ERI.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Because this proposal only establishes a trade-off backstop to an alternative compliance path and not a prescriptive code requirement (the prescriptive requirements are already much more efficient than the proposed new backstop levels), and because most homebuilders are likely already meeting or exceeding these requirements, we conclude that there will not necessarily be any cost impact.

RE151-19

Public Hearing Results

Committee Action: **Disapproved**

Committee Reason: We do not need a backstop, the backstop is the reference design (Vote 11-0).

Assembly Action: **None**

Individual Consideration Agenda

Public Comment 1:

IECC®: R405.2 (IRC N1105.2)

Proponents:
William Fay, representing Energy-Efficient Codes Coalition (bfay@ase.org); William Prindle, representing EECC (wprindle@icfi.com); Daniel Bresette, representing Alliance to Save Energy (dbresette@ase.org); Maureen Guttman, representing Building Codes Assistance Project (mguttman@bcapcodes.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing American Council for an Energy-Efficient Economy (misuriello@verizon.net)

requests As Modified by Public Comment

Modify as follows:

2018 International Energy Conservation Code

R405.2 (IRC N1105.2) Mandatory requirements. Compliance with this section requires that the mandatory provisions identified in Section R401.2 be met. ~~The~~ *building thermal envelope* ~~shall be greater than or equal to levels of efficiency and~~ *Solar Heat Gain Coefficients* ~~in Table R402.1.1 or R402.1.3 of the 2009~~ *International Energy Conservation Code.* The proposed total building thermal envelope UA which is sum of U-factor times assembly area, shall be less than or equal to the building thermal envelope UA using the prescriptive U-factors from Table R402.1.4 multiplied by 1.15 in accordance with Equation 4-1. The area-weighted maximum glazed fenestration SHGC permitted in Climate Zones 1 through 3 shall be 0.30. Supply and return ducts not completely inside the *building thermal envelope* shall be insulated to an *R*-value of not less than R-6.

$$UA_{Proposed\ design} \le 1.15 \times UA_{Prescriptive\ reference\ design} \quad Equation\ 4\text{-}1$$

Commenter's Reason: This proposal should be approved as submitted or as modified because it would provide an envelope backstop that would help maintain a reasonable level of building envelope efficiency in homes constructed under the performance path. An efficient thermal envelope is crucial to a comfortable and energy efficient home and minimum levels of envelope efficiency should not be traded off under alternative compliance methods like the performance path. This principle has already been recognized in the ERI path and the purpose of this proposal is to apply this approach to the performance path as well. The original reason for the proposal further explains the benefits of an envelope backstop for the performance path.

The proposed modification would provide additional flexibility for builders by permitting a Total UA-based backstop instead of requiring certain R-values for each component and includes appropriate SHGC requirements for fenestration. The proposed modification would match the language recommended for approval in RE150-19, making the minimum thermal envelope requirements the same for both the Simulated Performance Alternative and the Energy Rating Index (without on-site generation). This modification would also reference the current edition of the IECC, instead of a static reference to the 2009 IECC.

The Committee reason confuses the proposed backstop and the standard reference design in the performance path, stating that "We do not need a backstop, the backstop is the reference design." There is a big difference between the reference design, which merely establishes the baseline home for potential trade-offs, and a backstop requiring minimum performance for specific building elements. The performance path baseline is based on the prescriptive requirements of the current IECC, which are substantially more stringent than the proposed minimum values for the backstop, and elements of the standard reference design may be traded away. The backstop, on the other hand, is a more lenient set of requirements because it is intended as a "worst case scenario" for trade-offs and cannot be further traded away. When the ERI was added to the IECC in the 2015 IECC, it was widely recognized that a compliance path with so many trade-off opportunities would need to require compliance with mandatory measures and some amount of efficiency in the thermal envelope. Thus, minimum prescriptive requirements were included as a backstop for the efficiency of thermal envelope components. This backstop has been adopted by every state that has incorporated the ERI as part of a 2015 or 2018 IECC adoption.

This proposal is important for the same reasons that the Energy Rating Index includes a thermal envelope backstop. The efficiency of the permanent thermal envelope must be maintained at a reasonable level, since envelope components typically have a much longer life and are more likely to remain unaltered over the useful life of the building. The proposed backstop in this code change is a good first step in that it reflects a modest level of protection given the current performance path. Adopting the modification above would apply the same Total UA-based backstop to both the ERI and the performance path.

Cost Impact: The net effect of the public comment and code change proposal will not increase or decrease the cost of construction
As stated in the original proposal, because this only establishes a trade-off backstop to an alternative compliance path and not a prescriptive code requirement (the prescriptive requirements are already much more efficient than the proposed new backstop levels), and because most

homebuilders are likely already meeting or exceeding these requirements, we conclude that there will not necessarily be any cost impact.