



PATHWAYS TO CODE COMPLIANCE 2021 ENERGY CODES RAISE THE BAR; MORE AGGRESSIVE CHANGES ARE AHEAD

Continuing to raise the bar in energy code requirements stands to benefit nearly all, as long as costs to comply are not unreasonable and the method for following the requisites is clearly defined.

Codes help provide homebuyers a guarantee that they have purchased a home that meets modern minimums for energy efficiency and should, as a result, have significantly lower utility bills. Codes force builders to play on an even field. Higher-performing homes help utility providers better forecast peak demands, while state and local governments benefit from reduced energy demand. Lower greenhouse gas emissions are a benefit to all.

The governing bodies who write the building codes undergo an onerous process of testimony, revisions and appeals before issuing updates every three years. The International Energy Conservation Code (IECC) is the guidebook for the most widely adopted energy codes for residential construction in the U.S. While IECC contains energy provisions for both residential and commercial builders, IRC addresses all topics from structural and plumbing, to mechanical and energy, etc. In 2002, Texas adopted the IECC and the IRC energy chapter and as its residential building energy code as its guiding models for new construction and existing homes.



The latest 2021 IECC, publishing in February 2021, marks the most significant changes in model energy codes in the last decade with requirements that raise the performance bar by approximately nine percent overall compared to the 2018 IECC. With rising home prices, amid a perfect storm of low inventory coupled with material and labor shortages, NAHB and other trade organizations are concerned that the increased requirements will raise costs to further challenge home affordability. Accordingly, NAHB has developed a series of adoption kits that include highlights of changes from the previous model code edition, associated cost increases, and a list of suggested amendments that offer more cost-effective and affordable energy conservation provisions than available in the model codes.

The code adoption process by each state or jurisdiction is also lengthy with public hearings and an opportunity to amend codes prior to adoption, taking into consideration climate zone differences in various locales to make adjustments accordingly. As of June 2021, NAHB showed no states yet adopting the 2021 IECC, 17 (including Texas) currently using 2018, 15 using 2015, and others still using previous years, their own state-developed code or no statewide code. As of January 2022, California, Washington and Vermont had adopted the 2021 IECC for residential construction. However, while state law generally “adopts” codes, a city arguably cannot enforce those codes without an ordinance in place. Conversely, cities can move ahead of their state legislators to adopt new codes. Kansas City, MO, was the first city to adopt the 2021 IECC. Austin, TX, adopted it on September 1, 2021.

Current Building Envelope minimums set fenestration U-factors (the rate at which a window, door, or skylight transmits non-solar heat flow) at .32 in the 2018 IECC. The 2021 IECC model code lowers the U-factor minimum to .30. Currently, the Texas energy code matches .32 for Climate Zone 3 (CZ 3) and amended the requirement for

Climate Zone 2 (CZ 2) to .40. Glazed Fenestration Solar Heat Gain Coefficient (SHGC) was not stipulated by the 2018 IECC but is now stipulated at .40. (It should be noted that when Texas adopted the 2018 IECC, it set its own SHGC requirement of .25 for CZ 2 and CZ 3. The lower the value the better for U-factor, so we are already ahead of the curve here.)

For R-Value (resistance a material has against heat flow, or temperature conduction), a higher number is better. 2018 IECC set a minimum for ceiling insulation at 49 and 2021 IECC calls for 60 R-value ceilings; Texas lowered ceiling R-Value to 38 for CZ 2 and CZ 3 when it amended the 2018 codes.

R-values for walls represent the sum of cavity insulation plus insulated sheathing. Texas currently complies with the 2018 IECC wood frame wall recommendations for CZ 3—R-value minimum of 20, or R-13 cavity insulation plus R-5 continuous insulation (ci). In CZ 2, Texas lowered the wood frame wall R-value requirement to 13. 2021 IECC specifies R-20 cavity insulation plus 5ci, R-13 with R-10 ci, or zero cavity insulation with R-15 ci.

While Texas sets floor insulation R-Value at 19 for Zone 3 and at 13 for Zone 2, the IECC code minimum floor R-Value remains at 30 in the 2021 IECC with three installation options allowed:

1. Insulation fully in contact with the underside of the subfloor (previously this was the only allowed option).
2. Insulation is permitted only to be in contact with the top side of the sheathing, separating conditioned from unconditioned space. Additional insulation must extend from bottom to top along the perimeter. Framing must be air-sealed.

1. Similar to option 2, insulation is permitted to be in contact with continuous insulation along the underside of the floor framing. The combined cavity insulation and continuous insulation must meet the required R-value for floors.

Ducts are required by the Texas energy code to be tested and verified to have total leakage of no more than 4 cubic feet per minute (cfm) per 100 sq. ft (or 3 cfm if an air handler is not installed). Attic supply and return ducts are required to be sealed and insulated to R-6 or R-8 depending on diameter and ducts in other parts of the building have similar mandates ranging from R-4.2 to R-6. 2018 IECC waived the duct testing where the air handler and all ducts are located inside the conditioned space; under 2021 IECC, all ducts will be required to be tested, regardless of location.

Texas' adaptation of the 2018 IECC requires the building envelope to be properly sealed and tested and verified as having an air leakage rate no higher than 3 Air Changes per Hour (ACH) at 0.2 water gauge (w.g.) for CZ 3, and no higher than 5 ACH at 0.2 w.g. for CZ 2. Recessed lighting in all Texas zones must also be sealed to limit air leakage.

Appropriate construction documents and preventative maintenance information must be provided, along with a permanent certificate



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listing certain insulation, window, and HVAC performance information. Texas code also says HVAC must be properly sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J or other approved methodologies. Piping for mechanical systems and hot water are required to be insulated to R-3. The lighting minimum requires 90 percent of permanently installed fixtures to contain only high-efficacy lamps as defined by IECC. The 2021 IECC raises the baseline in most of these areas slightly and Texas is also expected to do the same when it starts the adoption process.

If it all sounds complex and confusing, know that you're not alone in thinking so. Industry leaders have long complained that the State Energy Code leans too heavily on the IRC's version of the Energy Rating Index (ERI), which has been inconsistent and caused significant market confusion. The adoption of Texas House Bill 3215 as a universal energy code compliance pathway updates the state's universal energy code compliance pathway to allow builders to use the HERS Index for energy code compliance across the state, in lieu of the state energy code or any stretch code adopted by municipalities. This means every city must recognize the independent HERS Index option regardless of what IECC version they have adopted locally (identical to how ENERGY STAR certification is also hardcoded into law to demonstrate code compliance). Homes using the HERS compliance option must still meet specific mandatory building thermal envelope requirements of the 2018 IECC.

This independent HERS pathway will be on a 10-year plan until it is required to be revisited at the State level again. Texas' new compliance pathway sets a maximum HERS Index of 63 for the vast majority of homes built in the state. That threshold moves to a more-efficient HERS Index of 59 or below on September 1, 2022, and establishes a HERS Index rating of 55 in order to comply after September 1, 2028.

What's Next? From 2006 to 2021, the IECC increased its efficiency requirements by about 40 percent, or an average of 8 percent a cycle. Savvy Builders staying ahead of the curve voluntarily will be ready for changes. As it begins the process of working in IECC 2024, The Code Council is considering strengthening the code and its adoptability by moving from a code development process to a standards development process for the IECC. If the IECC is developed as a standard, it would be updated using the Code Council's Consensus Procedures, which comply with the American National Standards Institute (ANSI)'s essential requirements to prevent dominance by any interest category. The standards development process would allow for additional time for debate and put the IECC on a continuous maintenance cycle to allow for more timely consideration of rapid advancements in technology.