Protecting Homeowners from Energy Efficiency Rollbacks

How misinterpretations of the 2015 IECC residential building energy code could reverse energy efficiency progress

A potential misinterpretation of building energy codes threatens to erode 25 years of progress in making homes more energy efficient and affordable. The 2015 International Energy Conservation Code (IECC) creates an Energy Rating Index (ERI) compliance path, giving builders more flexibility for IECC compliance. But methods used to calculate compliance in the ERI path can be misapplied, allowing builders to earn credit for the use of onsite energy generation, including rooftop solar photovoltaic (PV) systems. Renewable energy was never intended to be part of the 2015 IECC and this misuse of the ERI compliance path could lead to the construction of homes far below the IECC's current thermal protection standards. States and localities updating their codes should make clear that compliance with the 2015 IECC code **does not** include the production of energy if they wish to continue progress on building more efficient homes.

A building's **thermal envelope** is made of the physical components that protect its conditioned space, including insulated foundations, roofs/ceilings, and walls, as well as doors and windows.

Reversing energy efficiency progress. The purpose of a building energy code is to conserve energy by increasing a home's energy efficiency—and it works. IECC codes have reduced new home heating energy usage by roughly 50 percent since 1992. Allowing a tradeoff between onsite generation and energy efficiency could erase the gains made over the past several code cycles that require updated building envelope measures in new homes. It would mean that homes could be built less efficient, as long as more power is generated onsite. This could result in lower performing thermal envelopes than any ever permitted under a U.S. model energy code, and could set back progress on efficient homes many years.

Experts agree that the 2015 IECC code addresses the use and conservation of energy, not the production of energy. The Energy Systems Laboratory at Texas A&M University confirms that residential provisions of the 2015 IECC do not define or mention onsite power production (solar or otherwise) as a substitute for thermal protection measures to meet ERI compliance.

New technologies, including PV, can be a part of a state's strategy toward net-zero energy homes or other sustainability-focused goals. But they are simply not a replacement for the core value of the energy conservation code, which is permanent thermal protection through efficient building envelopes.

Bad for homeowners. If a PV tradeoff credit is permitted, this could create an incentive to reduce construction costs by meeting lower thermal envelope requirements in exchange for using a solar PV system. Unlike the building envelope energy efficiency features, which are folded into the cost of the home, solar panels can be financed separately through a solar energy vendor who contracts directly with the homeowner. This results in a nominally cheaper home to build. But such financing mechanisms are not always available and can disappear when markets change, and they mask the true costs to consumers.

When a solar PV system is used as a tradeoff for a sound thermal envelope, it actually raises the net cost of homeownership. Removing thermal measures to add PV is like leaving the front door open all day, wasting energy and driving up home energy bills. In addition, the degraded thermal envelope

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could create home comfort and moisture problems and require larger and more expensive solar PV and heating and cooling systems. Depending on the climate zone, a PV home with a degraded envelope could cost twice as much per month to own and operate as a home built to meet the prescriptive requirements in the 2015 IECC.

Thermal envelopes build permanent efficiency into homes; solar panels do not. Homeowners benefit from a more efficient home, whether or not some of their electrical load is offset by PV or other renewables. Thermal envelope measures required by code, like insulation and air sealing, are permanent, saving energy for the life of the home. But the output of solar panels is less predictable; they don't last as long as the thermal envelope, can be removed, and are subject to performance degradation and shading from trees and structures.

Thermal envelope measures are also easier for code officials to inspect and verify. Insulation and window products are clearly labeled under federal regulation and code provisions; solar PV systems and components are not. PV raises other questions, including: How do code officials verify estimates of how much energy the system will produce? How do inspectors ensure the system is permanently attached and integrated into the building, and not subject to removal in the event of a home sale, default, or other circumstances? Unlike thermal envelope measures, there is no assurance that PV systems will perform as rated over the life of the building.

This threat requires immediate, concerted action. If not addressed clearly and consistently as states and localities consider 2015 IECC adoption, the potential misinterpretation of renewable generation tradeoffs could blow a big hole in American energy codes' core mission, which is thermal protection of new homes. To address this risk, manufacturers, thermal envelope contractors, local environmental and fair housing advocates, and utilities should work with their state and local building code entities to clarify that the 2015 IECC does not allow the use of renewable energy generation, including rooftop solar PV systems, to supplant thermal envelope measures through the ERI compliance path.

Working together, stakeholders can keep America's energy codes strong, ensuring that the building industry continues the trend of building comfortable, healthy, durable, and energy-efficient homes—protecting homeowners today and for generations to come.

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