

LOVELAND BUSINESS ROUNDTABLE

WHERE QUALITY OF LIFE AND PUBLIC POLICY INTERSECT



The Hidden Costs of Energy Codes: a Looming Affordability Issue

Policy White Paper

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What do energy codes have to do with home affordability?

Building energy-efficient homes and other structures is crucial to meeting targets set by the state and federal governments for the reduction of fossil fuel consumption and greenhouse gas production. Utilizing sustainably sourced, carbon-neutral materials in construction is also mandated by new targets for environmental conservation. Colorado passed HB22-1362, Building Greenhouse Gas Emissions, last year to create two new model codes that will guide future energy code adoptions locally.

At the same time that builders are making these improvements to construction practices and building materials, we face a crisis of housing affordability. According to a study released by the National Association of Home Builders in their March/April issue of Pro Builder, only 38.1% of new and existing homes were affordable for a household earning the median income of \$90,000.

Rising costs of materials, labor, and financing are already pricing more and more families out of the market for homeownership and affordable rental housing. Adding more cost increases related to energy efficiency regulations will only widen the gap between new home prices and affordability for families in our community.



What do energy codes have to do with home affordability? (cont'd)

One of the goals of energy efficiency is to reduce the cost of energy consumption over the life of the home or structure. While it's true that reduced energy costs can help to offset some of the cost increases, it may not be enough to fully offset higher upfront costs. Many cost impact models for the 2021 energy code, for example, were performed in 2021 - before inflation hit the price of materials and labor, and before interest rates escalated.

In order to create more affordable housing options, we will need to implement new construction methods that can meet the new energy efficiency criteria without dramatically adding to the cost of construction. While systems and technology exist that can be implemented to achieve this, it takes a lot of time and investment to fully change construction methods and retrain workers on the new methods. This transition will be a lengthy process, and it faces opposition by the construction community because of the high costs as well as a resistance to changing "the way we have always done it."

In this white paper, Loveland Business Roundtable examines the cost impact of new energy code requirements on housing affordability. By drawing upon the expertise of industry professionals, this paper aims to shed light on the relationship between energy codes and the affordability of housing. Additionally, it explores strategies that can be employed to mitigate the cost implications while maintaining energy efficiency goals.

Key definitions

Energy Codes:

Standards for the design and construction of buildings, ensuring that they meet certain energy performance requirements. Energy codes play a crucial role in driving energy efficiency in the built environment. They serve as a foundation for promoting energy-efficient building practices. They contribute to reducing greenhouse gas emissions, decreasing energy consumption, and enhancing overall sustainability. By setting standards for insulation, lighting, HVAC systems, and renewable energy integration, energy codes encourage builders and homeowners to embrace energy-efficient solutions. (Source: energy.gov)

However, as these codes become more stringent; concerns arise regarding the potential cost impacts on housing affordability.

R-Value:

a measure of insulation's ability to resist heat traveling through it. The higher the R-Value, the better the thermal performance of the insulation. (Source: energystar.gov)

BCG Energy Code Comparison Chart (Climate Zone 5)* ¹							
Building Element	Measured Criteria	2006	2009	2012	2015	2018	2021
Ceiling	R-Value	38	38	49	49	49	60
Wood Frame Wall	R-Value	19 or 13 + 5	20 or 13 + 5	20 or 13 + 5	20 or 13 + 5	20 or 13 + 5	30 or ** ⁴
Mass Wall* ²	R-Value	13	13/17	13/17	13/17	13/17	13/17
Basement Wall* ³	R-Value	10/13	10/13	15/19	15/19	15/19	15/19 or 13 + 5
Floor	R-Value	30	30	30	30	30	30
Slab	R-Value & Depth	10, 2 ft.	10, 2 ft.	10, 2 ft.	10, 2 ft.	10, 2 ft.	10, 4 ft.
Footnotes:							
1. This chart reflects the requirements in the body of the national code (IRC) and does not reflect any local amendments.							
2. The second R-value applies when more than half the insulation is on the interior.							
3. The first R-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.							
4. R-value options for 2021 Wood Frame Wall = 30, 20 + 5, 13 + 10, or 0 + 20 (first value is in framing cavity, second is continuous insulation).							

New Energy Codes and Costs

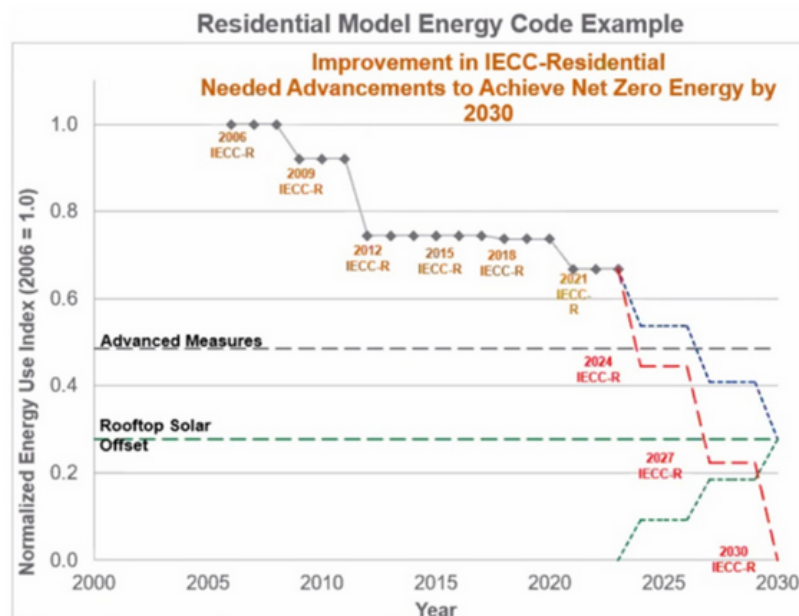
Key Elements of Energy Code Requirements:

Energy code requirements encompass various aspects of building design and construction. These typically include insulation levels, window efficiency, lighting standards, equipment efficiency, and renewable energy provisions. Compliance with these requirements ensures that buildings are constructed to minimize energy waste and maximize energy performance.

Increased Costs of New Energy Code Requirements:

Implementing new energy code requirements leads to increased construction costs. Upgrades to insulation, high-efficiency equipment, and renewable energy systems often require additional investments during the construction phase. These added costs can strain the budgets of builders, developers, and homeowners.

Northern Colorado building code expert Caleb Sulzen shared that one of his clients asked a local builder to price an upgrade from the 2018 energy code to the 2021 energy code, and the difference was more than \$60,000. This sharply contrasts some projections that estimate an average of \$12,000 to implement the 2021 energy regulations instead of those from 2018.



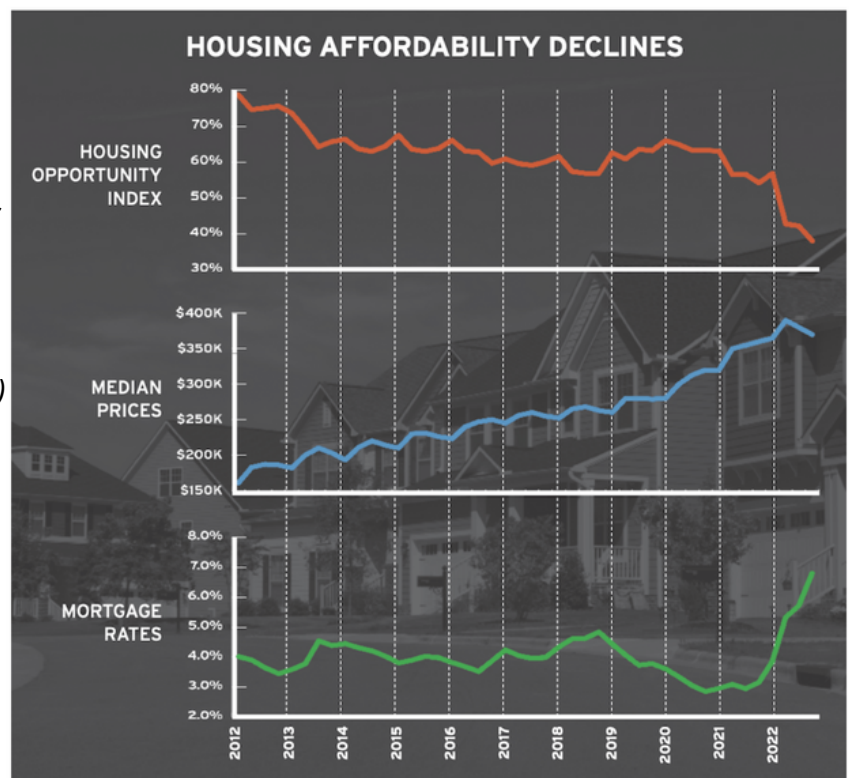
Source: PNNL

Focus on home affordability challenges

Impact on Housing Affordability: As construction costs rise, the prices of newly built homes and rental units will increase accordingly. This trend can limit housing options, particularly for low- and moderate-income households, exacerbating existing affordability challenges. As the upfront costs increase, they exceed the back-end savings through a reduction in energy usage on an annual basis. These cost increases can place homes out of reach for households who cannot qualify for mortgages in higher price brackets.

Challenges for Low-Income Households: Stricter energy codes can create challenges for low-income households. The increased costs associated with compliance may deter developers from building affordable housing units or lead to a decrease in the number of available affordable options. This situation emphasizes the need to strike a balance between energy efficiency goals and housing affordability.

*Source: NAHB/Wells Fargo Housing Opportunity Index (Core Logic, Census Bureau, HUD, Freddie Mac, and MBA. Analyzed by NAHB Economics & Housing Policy Group)
Note: CoreLogic changed the structure of its data files in Q4 2022. The overall impact on the HOI results is minimal | Photo: Konstantin L / stock.adobe.com*



What can be done to mitigate cost impacts of the new codes?

Optimal Design and Construction Techniques:

Incorporating optimal design and construction techniques can help mitigate the cost impacts of new energy code requirements. Implementing passive design strategies, such as proper orientation, shading, and natural ventilation, can reduce the reliance on energy-intensive systems. Similarly, adopting advanced construction methods and materials can enhance energy efficiency without significantly increasing costs.

Integrated Energy-Efficiency Measures: Integration is key to cost-effective energy efficiency. Employing a whole-building approach ensures that energy-efficient measures work together synergistically, maximizing their effectiveness and minimizing costs. Strategies such as air sealing, improved duct design, and efficient lighting systems can collectively yield substantial energy savings.

Training and Education: Investing in training and education programs is vital for the successful implementation of new energy code requirements. Builders, architects, and construction professionals must stay updated with the latest techniques and technologies in order to effectively comply with energy codes while minimizing costs.

Long-Term Energy Savings: Implementing energy-efficient construction methods reduces the annual cost of energy consumption. This can help offset the upfront investment required to increase energy efficiency. The tables below are based on the national estimates of around \$12,000 on average to upgrade from the 2018 energy code to the 2021 energy code. But recall (from page 5) the finding that local implementation of the 2021 code will cost more than \$60,000 per home. ***This increases the payback time to more than 60 years to achieve an estimated 9% increase in energy efficiency.***

Table ES.1. Life-Cycle Cost Savings for the 2021 IECC

Climate Zone	Compared to the 2018 IECC (\$/dwelling unit)
1	3,536
2	2,854
3	2,829
4	2,243
5	1,034
6	970
7	3,783
8	6,782
National Average	2,320

Table ES.2. Simple Payback Period for the 2021 IECC

Climate Zone	Compared to the 2018 IECC (Years)
1	4.8
2	7.6
3	8.6
4	12.4
5	16.7
6	11.2
7	9.6
8	7.3
National Average	10.5

Final Thoughts from Loveland Business Roundtable

Energy efficiency and carbon reduction goals are generally regarded by governments and citizens as forward-thinking and smart. Setting mandates and goals also provides a talking point for politicians and allows an illusion of progress toward environmental objectives. To their credit, the building industry responds to energy efficiency goals and mandates with best practices and state-of-the-art technologies. But what happens when energy efficiency goals collide with sky-high home prices in markets like ours in northern Colorado?

Elected officials at every level should be mindful of these financial realities when setting ambitious goals for increased energy efficiency. If the rigorous 2021 building code adds tens of thousands of dollars to the cost of a newly constructed home, in a period of high interest rates and inflation, these new homes will not be attainable for most potential buyers.

We encourage elected officials, citizens, and industry professionals to engage in thoughtful, pragmatic discussions regarding the costs of mandating rigorous energy codes in new home construction.



sources:

- *The Uncertain Future Cost of Colorado's Energy Infrastructure and Housing Affordability*, by the Mike A. Leprino Fellowship.
- *Cost and Other Implications of Electrification Policies on Residential Construction*, by Home Innovation Research Labs.
- *National Association of Home Builders – Pro Builder Publication*, March/April 2023 Issue.
- *Are Energy Codes Exacerbating the Housing Affordability Crisis?*, by Cherylyn Kelley.
- *National Cost Effectiveness of the Residential Provisions of the 2021 IECC*, by Pacific Northwest National Laboratory
- *Open AI Sourced Content.*