

USGlass

METAL & GLAZING



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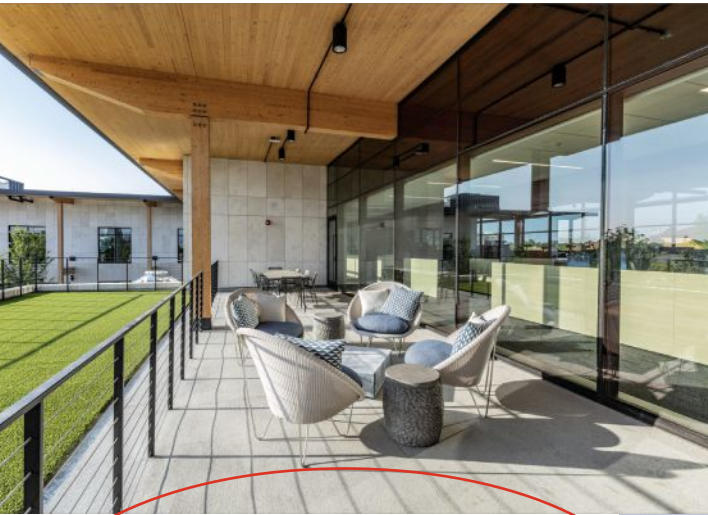
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Headlands Technologies in Chicago features a circular glass staircase, which was a collaboration between Glasshape, Glass Solutions and HDI Railing Systems. Turn to page 34 to read more. Photo: James John Jetel | jjjetel.com



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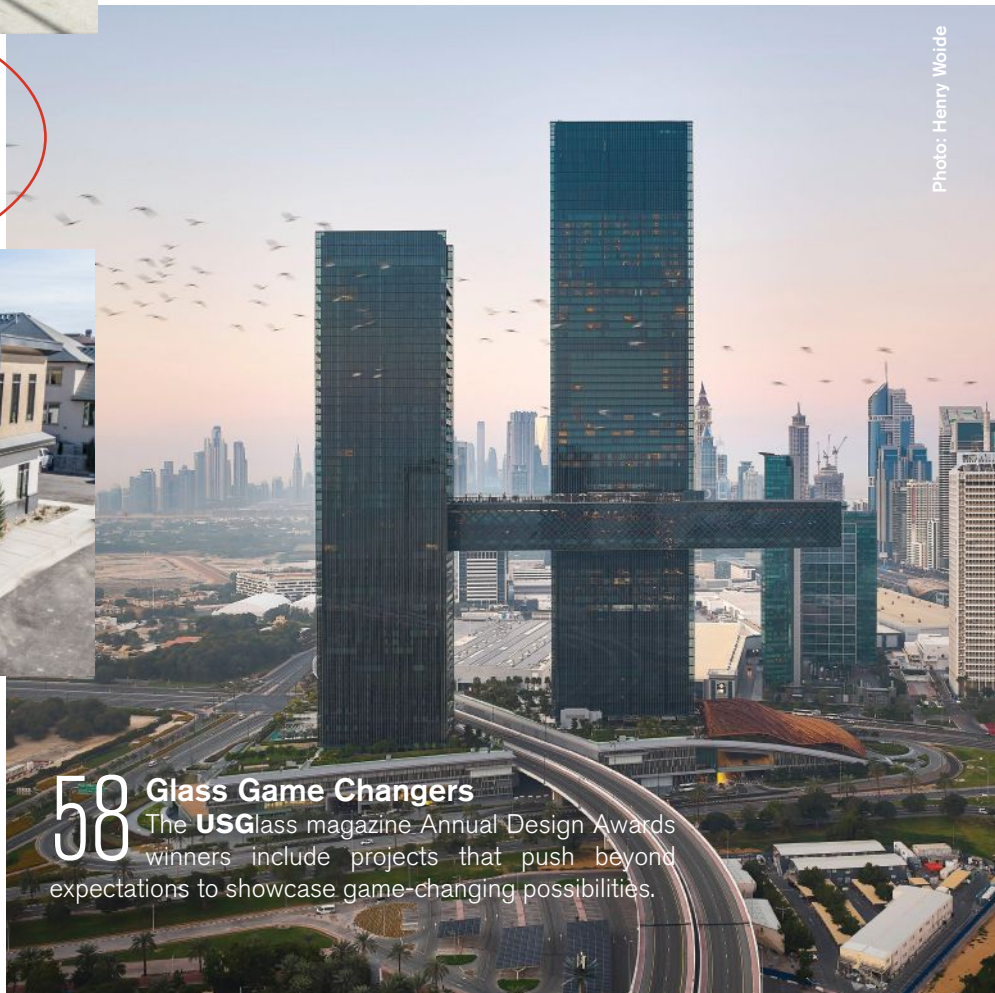


Photo: Henry Woide



The Battle Over **BUILDING ENERGY CODES**

Building energy codes help drive the widespread adoption of energy-efficient glass and fenestration products, improving the lives of building occupants and reducing carbon emissions. The First United Bank in Moore, Oklahoma features an abundance of high-performance glass, including Technical Glass Products' SteelBuilt Curtainwall Infinity Structural Silicone Glazing System. The system spans three floors and over 12,000 square feet.

Efficiency **vs.** Affordability

“Without energy codes, buildings throughout the country would likely still be built with single-pane windows in metal frames like they were 75 years ago.”

- Thom Zaremba, Roetzel & Andress

Building energy codes and standards are designed to improve and increase energy efficiency over time, so builders and industries can make feasible adjustments rather than radical changes.

The codes detail how commercial and residential buildings should be constructed to decrease energy demands, improve occupant comfort and lessen environmental impacts. As the United States Department of Energy’s (DOE) National Renewable Energy Laboratory reports, buildings are responsible for 40% of total energy use in the U.S., including 75% of all electricity use and 35% of the nation’s carbon emissions.

Codes consultant Thom Zaremba, a shareholder at Ohio-based Roetzel & Andress, says energy codes are vital to improving a building’s carbon footprint and fostering innovation in the glass industry.

“Without energy codes, buildings throughout the country would likely still be built with single-pane windows in metal frames like they were 75 years ago,” he explains. “That would not be good for the glass industry and certainly not for building owners struggling to keep up with constantly rising energy costs.”

Paul Bush, Vitro Architectural Glass’ vice president of technical services/sustainability and government affairs, adds that building energy codes help drive the widespread adoption of energy-efficient glass and fenestration products.

“Building codes emphasize the key role of glass in modern architecture,” he says. “From large windows that bring in natural light to energy-efficient glazing systems, glass is vital in contemporary design. These codes boost energy efficiency, cut heating and cooling costs and reduce a building’s environmental impact. With code compliance, architects and builders can create visually stunning and eco-friendly spaces.”

Push Back

Despite the benefits of building energy codes, multiple states and officials question the value of sustainable building energy standards as affordability becomes a concern due to housing shortages. “Affordable” has multiple meanings, ranging from deciding if a building is affordable to purchase and operate to determining whether the cost of operation offsets the increased construction cost.

Most concerns surrounding building energy codes and affordability center on residential construction. Notably, 15 states and the National Association of Home Builders (NAHB) filed a lawsuit in early January 2025 against the United States Department of Housing and Urban Development and the U.S. Department of Agriculture, challenging new minimum energy standards for certain single-family and multi-family housing programs.

Non-residential buildings are also in the crosshairs as well.

One such attack is in Missouri, where Representative Mike Jones (R, District 012) introduced House Bill (HB) 939 in January 2025, which seeks to limit the abilities of counties and municipalities to enact or maintain green/sustainable building standards in their codes if the standards increase a building’s cost. The bill targets a range of buildings, including one- or two-family dwellings, condominiums, multi-unit townhouses, multi-unit apartment buildings and commercial or industrial buildings.

“We have a crisis in affordable housing in our state,” says Jones. “The median home price in Missouri has soared to \$459,000, putting homeownership out of reach for many families. HB 939 ensures that unnecessary green energy mandates do not make it even harder for Missourians to afford a home.”

Supporters of HB 939 cite Kansas City as a cautionary example, stating that the city reported a 54% drop in building permits and a decline in active builders after adopt- ➔

BUILDING ENERGY CODES

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DOE studies show that model energy codes for commercial and residential buildings could save owners a cumulative \$182 billion in energy savings and 15.8 quads of primary energy. This includes the addition of high-performance glazing, which improves the energy performance of a building while maintaining transparency.

ing the 2021 IECC in late 2022. However, a DOE analysis in 2021 found that if Missouri adopted the 2021 IECC for single-family and low-rise multi-family residential buildings, statewide savings would amount to \$657 in annual utility bills for the average Missouri building occupant. It would also reduce statewide carbon emissions over 30 years by 13,710,000 metric tons.

Missouri is not the only state targeting the perceived imbalance of building energy codes and affordability.

Several state representatives have recently attempted to roll back building and energy codes. Legislation was introduced (now dead) in Iowa to repeal new construction energy conservation requirements and permit local governments to adopt energy standards less stringent than the state building code. Idaho also passed a bill in 2023 (HB 287) removing a clause that allowed certain local governments to enforce energy codes or requirements more stringent than the 2018 Idaho Energy Conservation Code, limiting local authority to implement stricter energy efficiency measures.

Zaremba points out that some southern and midwestern states have fallen behind on energy codes. For example, the International Code Council's (ICC) Master I-Code Adoption

Chart shows that as of January 2024, South Carolina's commercial and residential energy codes have not been updated in the last 16 years. Similarly, Oklahoma has not updated its commercial energy code in 16 years either.

Zaremba notes that enforcement is falling behind in some areas where building and energy codes are adopted at the state level but enforced locally.

Critics vs. Regulators

Building energy codes' restrictions and price concerns are not strictly legislative. In a January 2025 article in *Master Resource*, authors Mark Krebs and Tom Tanton argued that building energy codes currently do not benefit consumers or the environment. *Master Resource* is a forum about energy markets and public policy.

Krebs and Tanton claim that building energy codes and standards are policed and pushed by "policy-driven regulatory agencies and officials" and hinder choice. They write that the codes intentionally limit consumer options and "drive up utility costs, [increase] construction costs, squander taxpayer dollars and lead to additional overall inflation."

Despite the aforementioned instances of pushback against building energy codes, Zaremba doesn't expect rollbacks in their stringency. That's because the two major developers of energy codes and standards, ICC and ASHRAE, are "consensus-based organizations with multiple voting stakeholders."

"While the DOE and Environmental Protection Agency are persuasive voices in developing these codes and standards, it seems highly unlikely that the many other participants in these code development organizations will roll back existing energy code stringencies," he says. "Instead, it is far more likely that they will continue a course of slowly but steadily increasing energy code stringency."

Helen Sanders, general manager of Technoform North America Inc. in Ohio, agrees—with a small caveat.

"Rollbacks, or at least slowdowns, in achieving additional levels of stringency are possible," she says. "We see this in the 2027-IECC development process, where it appears harder to pass higher stringency measures. However, it also appears there will be an incremental increase in stringency of fenestration thermal performance in ASHRAE 90.1-2025, which has the potential to be matched by the 2027-IECC."

FIGHTING TO EXPAND GLASS' ROLE IN ENERGY EFFICIENCY

While legislators question the cost-benefit of building energy codes as housing shortages continue, the glass industry faces another issue: model energy codes structured to benefit HVAC-focused design.

Helen Sanders, a general manager at Technoform, has repeatedly spoken out on the HVAC industry's ability to set the building envelope's performance without input from glazing experts. This reduces opportunities for glass companies.

"[The glass] industry has an opportunity to promote more envelope-first codes, which would drive higher-value fenestration products, reducing the need to cede revenue and profits to adjacent industries, such as HVAC and lighting," she says.

In a February 2025 *Insights and Inspirations* article, Sanders addressed the topic with information gleaned from a Façade Tectonics Institute market barriers study. She noted that HVAC contractors often provide building energy modeling for architects as a free service. Without the glass industry's input, energy modelers use HVAC systems to "manage the enclosure's heat gain and thermal losses rather than minimize the façade-related loads."

"The [glass] industry is always concerned with the perceived risk of trading lower win-

dow area to achieve higher energy efficiency," says Sanders.

Sanders points to Massachusetts' strict building envelope requirements as an example of how, even with stringent envelope requirements, the window area has not suffered. In fact, the glass area throughout buildings has increased because of the widespread use of triple-pane glass.

"Advocating for a minimum requirement to provide sufficient daylight and views in buildings (daylight and views backstop) balanced with supporting increased envelope thermal performance would manage a lot of angst," explains Sanders. "This also would help participants feel more comfortable accepting minimum building envelope thermal performance standards (envelope backstops). Work on this is happening through advocacy in the International Building Code process."

Sanders notes that multiple steps are needed to ensure a more balanced envelope-first approach, including façade experts participating early in the design phase, improved building energy simulation quality and consistency, increased collaboration between mechanical and façade design professionals and educating mechanical engineers and contractors on façade solutions.

Despite DOE's state energy code adoption chart indicating that multiple states still construct buildings with a performance at or worse than the 2007 version of ASHRAE 90 (and some have no statewide commercial codes), states and local jurisdictions have incrementally adopted energy-efficient building codes. Granted, most adoptions occur in residential construction due to the EnergyStar® program, homeowner tax credits and other incentives.

Sanders notes that "enforcement of building envelope provisions is much higher in places where adequate funding for code enforcement is provided, such as Seattle."

Seattle City Light, for reference, is a local utility that funds the city's code office.

"Seattle City Light provides 50% funding for six full-time engineers and a department leader," says Sanders. "The City of Seattle code office can review building energy simulations and façade details. It also provides funding to develop increasingly more stringent energy

codes and to participate in national model code development."

Sanders expects increases in stricter codes in states that have the political will to do so, such as Washington, Massachusetts, New York and California.

By the Numbers

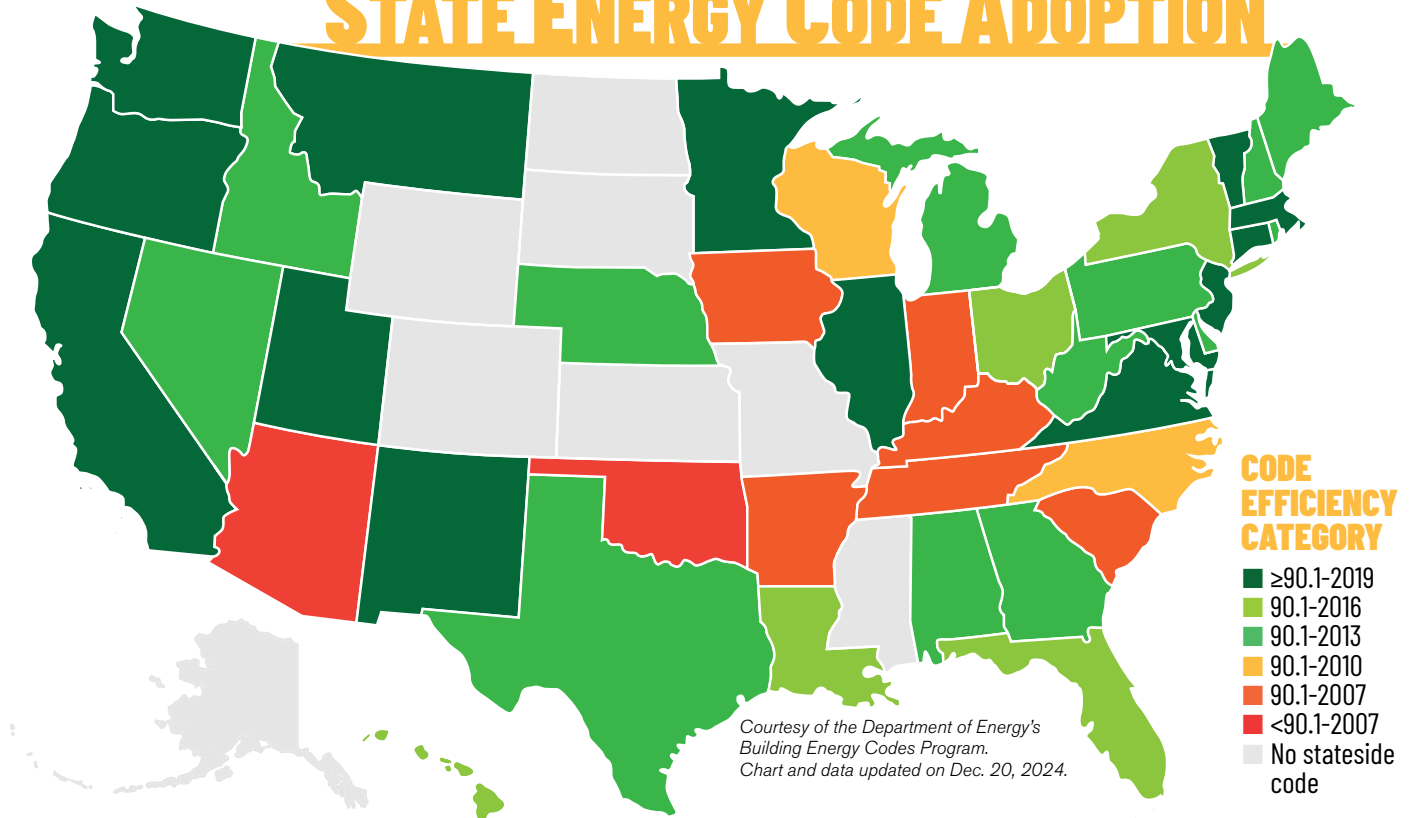
Multiple studies exist to highlight the merit of energy codes. For instance, a DOE analysis on the impact of building energy codes found that model energy codes for commercial and residential buildings could save owners a cumulative:

- \$182 billion in energy savings;
- 745 million metric tons of avoided carbon emissions; and
- 15.8 quads of primary energy.

For perspective, DOE says, "the total energy consumption of the entire U.S. commercial and residential sectors in 2023 was estimated at 35 quads."

According to an annual report by the ➔

STATE ENERGY CODE ADOPTION



Arizona, Oklahoma, Arkansas, Iowa, Indiana, Kentucky, Tennessee and South Carolina still construct buildings with a performance at or worse than the 2007 version of ASHRAE 90. Multiple states have no statewide code, according to DOE data.

United Nations Environment Program and the Global Alliance for Buildings and Construction, 2023 was the first year since 2020 when continued growth of building construction separated from greenhouse gas emissions. The report notes that this was due to various measures, including stricter building energy codes, mandatory performance standards, energy-efficient retrofitting of existing buildings and low-carbon materials.

As a result, the built environment's energy intensity was reduced by almost 10% globally, while the renewable energy share in final energy demand increased by nearly 5%.

From Policy to Practice

To further strengthen support for stronger energy codes, Bush suggests the glass industry push for more "collaboration with state and national policymakers, presenting clear, data-driven evidence of the energy efficiency benefits offered by advanced glazing technologies, and actively participating in public hearings and the code development process."

Sanders adds that while the glass and glaz-

ing industry already has high-performance products, it must invest further in commercialization as fewer products mean higher costs.

"Many commercial fenestration manufacturers have R-5 or better window performance, and glazing infill solutions are available, including triple-pane glazing, warm-edge spacer, fourth-surface low-E and even vacuum insulating glazing," she says. "The industry should continue to design efficient high-performance systems to fabricate and invest in manufacturing so pricing can be competitive."

Of course, commercialization is easier said than done. The Façade Tectonics Institute (FTI) studied the barriers hindering the commercialization of high-performance façade products. The Institute learned that there is no easy solution and even adopting modern building codes needs the coordination of "multiple approaches, including tools, training, standards, codes, innovation and incentives."

Sanders says the FTI study also found a lack of political will, policymaker knowledge, awareness and engagement in the process,

and insufficient resources and time to enforce energy codes.

“Funding is typically provided by permitting fees, and these cannot be too high as they need to be affordable,” she explains. “This typically results in an underfunded compliance capacity. Code officials typically prioritize life safety requirements, such as structural and fire protection.”

Sanders highlights several other barriers that the FTI study found, including:

- Insufficient training related to fenestration and façade assemblies;
- Insufficient code review. For instance, a code review is not typically required for contractors to prove their glazing details meet the requirements, and as such, they may not meet the code without incentive to ensure they do; and
- Inconsistent documentation. In particular, the National Fenestration Rating Council’s nonresidential fenestration labeling and certification program is not followed or enforced in most jurisdic-

tions (Seattle and California are exceptions) despite the code requiring labeled and certified fenestration.

FTI recommends several steps to drive high-performance facades, such as engaging with the insurance industry to explore opportunities, improving the impact of codes on high-performance façade solutions, developing an awareness campaign, and creating an installer training and façade engineering certification program, among others.

Sanders adds that Northeast Energy Efficiency Partnerships (NEEP) also recently completed a study highlighting the barriers to code adoption by states. The study identified that cost drivers and politics were intertwined, stating, “Costs influence politics, and politics influence costs in the building energy code process.”

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Superior thermal performance without compromising design or durability

Seattle’s award-winning Watershed building demonstrates how glass-forward exteriors can achieve the highest levels of sustainability.

Integrating Technoform’s hybrid warm edge spacer and polyamide insulation profiles helped create a high-performance glazing system that advanced the project’s environmental goals.

Technoform’s solutions improve thermal performance and condensation resistance without sacrificing durability or design.

Read more about this project:
technoform.com/project/watershed

Contact us:
info.us@technoform.com



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