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the pros and cons.

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Music to Their Ears

As the homebuilding landscape shifts, **builders have adjusted the narrative they use to define their product.**

For decades, U.S. homes have been sold by the square foot—bigger meant better. But as many high-level building pros reminded us recently at our *Leading from the Front* getaway, that story no longer fits a world of rising insurance costs, extreme weather, and buyers who care about health and efficiency. In response, builders have had to redefine value: not *price per square foot* but value per square foot—a measure that includes resilience, comfort and long-term affordability.

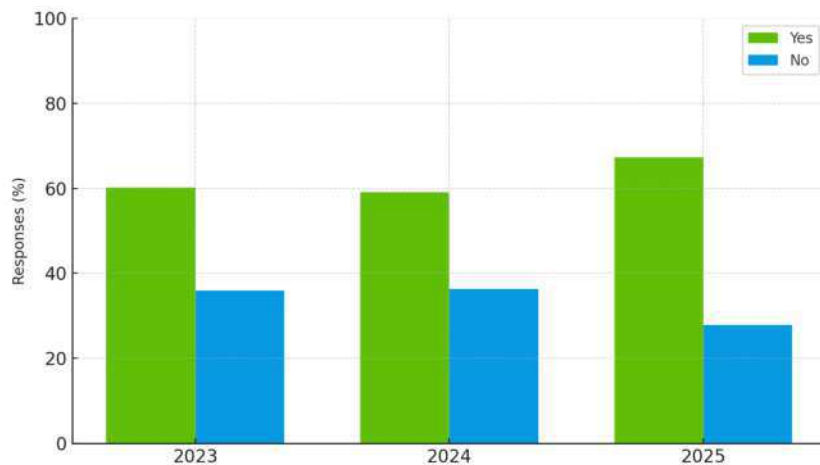
But there's a problem. Some of the most common words used to describe higher performance building have become politicized. Not every buyer will respond to terms like “sustainability” or “green.” They may, however, value those concepts when presented with other words. Surveys from the National Association of Realtors and our own COGNITION Smart Data show that energy efficiency and indoor air quality rank among the top priorities for homebuyers.

Many builders are pivoting to more universal language, such as *health, comfort and peace of mind*. These terms make similar promises—lower bills, cleaner air, fewer worries—without evoking ideology. “Healthy home” feels personal; “sustainable home” can sound abstract.

The logic (and the neuroscience) behind this is sound. Instead of appealing to a buyer's moral compass or triggering fear about climate change or spiking energy costs, builders have framed the home's resilience itself as good news. For example, instead of saying a home is “resilient against storms,” they might say “a home that protects your family.” Instead of “low embodied carbon,” they may say “built to last.” The idea is to make buyers feel empowered, not trigger their fear reflex to advance a sale.

It's a sound idea, but we do need to maneuver carefully when using words such as *empowerment and comfort*. These terms can easily warp into greenwashing. Of course, a house that's bigger is “more comfortable.” An estate built miles from the nearest neighbor “empowers” the buyer to live *his best life*, but comes at a high cost in transportation, resources and social isolation.

DO YOU ADVERTISE YOUR HOMES AS RESILIENT?



A growing benefit. “Resilient” has increasingly become a word that helps builders sell homes. SOURCE: COGNITION SMART DATA

Americans are already wallowing in “Comfort Culture”—marketing that urges them to pursue ease and luxury over challenge and frugality. Critics note this cultural obsession explains workplace issues, such as the disconnect between Gen Z workers and their employers. [Forbes](#), for example, says that focus on comfort has hurt innovation and productivity, because new ideas often break through only through stressful and uncomfortable efforts.

That doesn't mean these concepts are wrong. They just have to be used properly, not as “fluff” words to comfort the comfortable. Builders should reclaim the meaning of comfort as a *means* to resilience. You can be comfortable that your home will handle storms, wildfires or power outages—not just make you feel coddled during them. Here are a few concrete suggestions on how the conversation might be changed:

- **Lead with proof, not adjectives.** Show energy and insurance savings instead of slogans.
- **Use emotion carefully.** “Peace of mind” should point to measurable benefits.
- **Connect comfort to purpose.** Comfort should support health and stability, not indulgence.
- **Avoid moral signaling.** Replace “save the planet” with “protect your family's future.”

When builders ground emotional language in real performance data, *value* becomes visible and credible. The goal isn't to comfort people into complacency but to invite them into confidence: to show that a sustainable home is a *stronger, smarter, and more secure home*.

If the next generation of builders gets that language right, they won't just sell better homes—they'll reshape what Americans believe a good home truly is. **GB**



Matt Power
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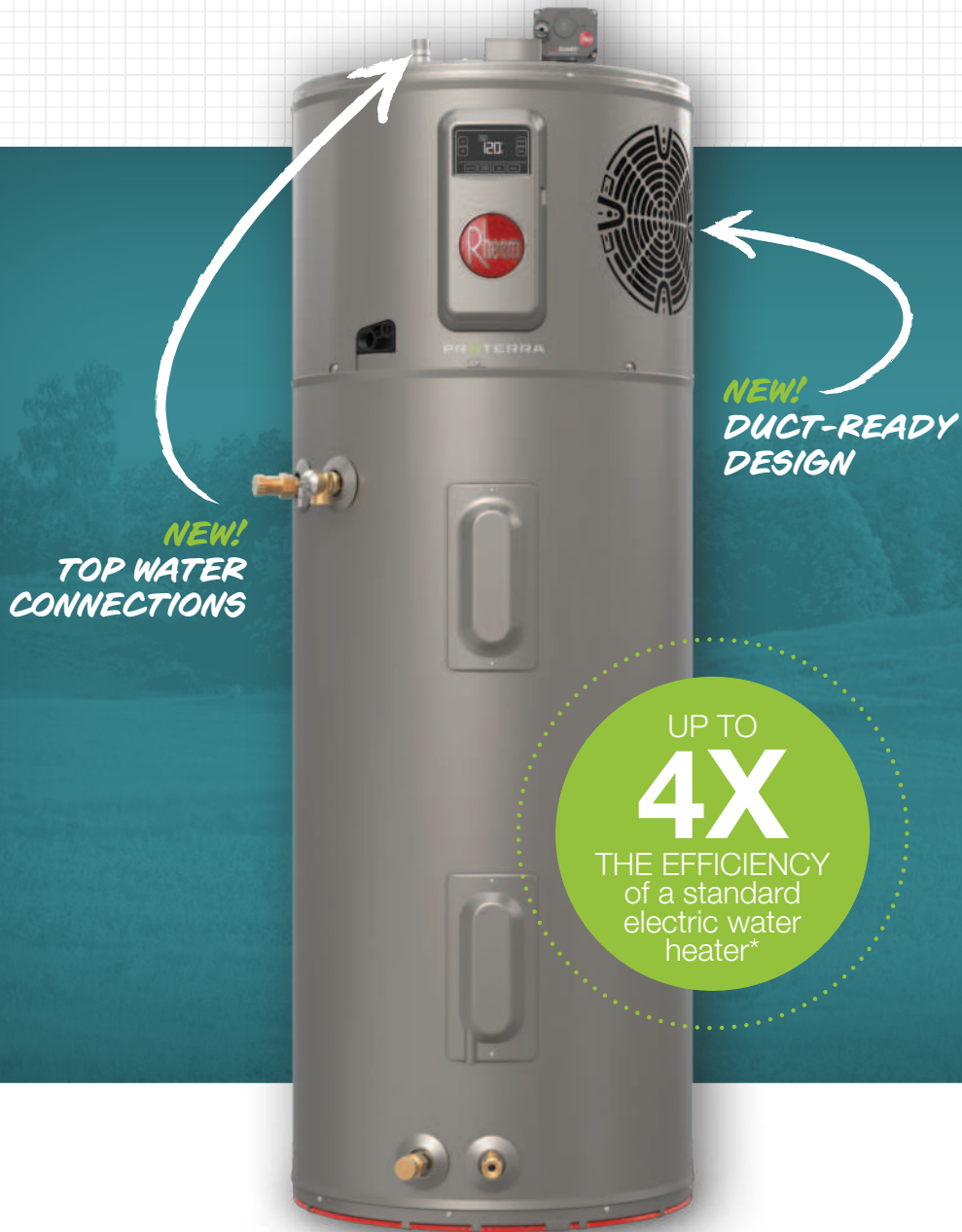
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Positive Times Ahead for Construction Industry?

A shrinking inventory and lower interest rates are expected to prop up housing for the rest of the decade.

The U.S. construction industry, suffering from an unprofitable year in 2025, is expected to rebound in 2026 due to strengthening nonresidential and infrastructure, according to a new forecast by Ducker Carlisle, a Troy, Michigan-based construction market consulting firm. The group's latest Construction Industry Outlook projects that total put-in-place construction will rise 5.3 percent next year and expand by an average of 5.7 percent through 2029.

The firm sees housing poised to rebound by early- to mid-2026 as builders clear backlogs and anticipated Fed rate cuts lift single-family starts raise financing challenges and ease pressure on labor and materials. This will create mixed conditions that shape commercial, institutional and infrastructure work, Ducker Carlisle notes.

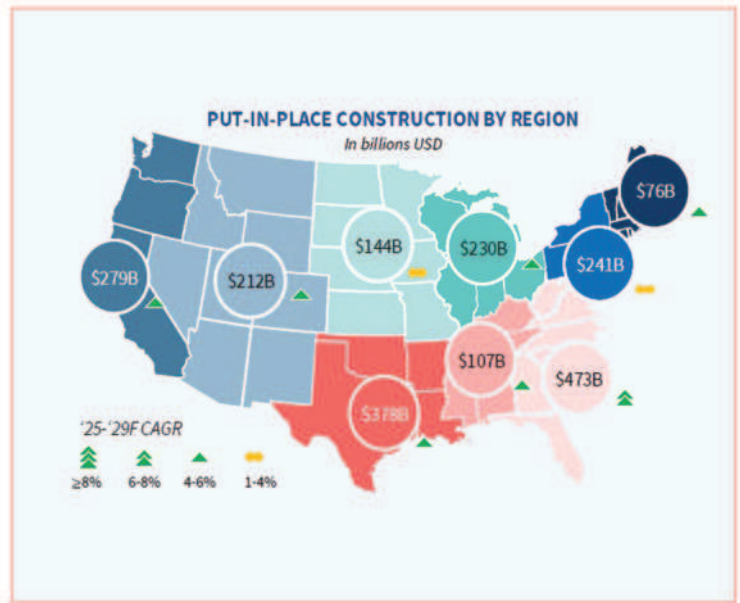
Key Construction Roles Lie Ahead for Women

Some of the jobs with the fewest female employees today will be the fastest growing through 2035.

Over the next 10 years, women will play a major role in handling a labor shortage within the construction industry, according to a report by construction parts manufacturer EPD. More women are expected to hold jobs in fields that are currently male dominated, such as radio and telecommunication installers, electricians, and construction managers. Projected growth in those three categories are 18.2 percent, 13.1 percent and 9.7 percent, respectively.

Several of the report's 10 fastest-growing professions are ones in which, at present, women barely exist. For example, only 1.6 percent of all plumbers are women, as are 2.3 percent of all carpenters, and 2.7 percent of all electricians.

"Bringing more women into the construction industry isn't just about equity—it's about meeting a critical workforce need," says Calum Mair, EPD's commercial director for North America. "Women bring fresh perspectives, problem-solving skills, and leadership that strengthen project outcomes. Our



Geographic gains. By 2029, almost half of the nation's \$2.14 trillion in construction spending will come from the southern U.S., primarily in Florida and Texas. SOURCE: DUCKER CARLISLE 2025 Q3 US CONSTRUCTION INDUSTRY OUTLOOK

Southern states are set to capture nearly half of national construction spending by 2029, fueled by migration and post-disaster rebuilding. Nonresidential growth will be led by data centers, health care and lodging, and data-center construction alone is forecast to top \$50 billion by 2029. **GB**



Who's in charge? The construction industry has an untapped resource in its struggle for qualified labor: Women, who make up only 15 percent of the workforce at present, but may account for 1 in 4 builders, plumbers, electricians and other specialists by 2035. CREDIT: ISTOCK/FATCAMERA

research shows that expanding their representation is essential to closing the labor gap and building a stronger future for the industry." **GB**

Golden State, Green Cities

In 2025, four of the five largest Greenest Cities in America are in California.

San Jose, the nation's 10th-largest city, is also the **Greenest City in America** in 2025, according to a report by personal finance company WalletHub. The annual report compares the 100 largest U.S. cities across 28 key indicators of environmental friendliness and sustainability, such as greenhouse gas emissions and smart energy policies in initiatives.

San Jose has the fifth-highest number of solar panel installations per capita. More than 47 percent of the city's electricity comes from renewable sources, the fifth-highest percentage in the country. The city also has numerous other environmentally conscious policies, such as the banning of plastic bags, a bike-sharing program, and local initiatives that promote the use of green energy, such as a solar power plant, according to WalletHub analyst Chip Lupo.

Four of the top 5 cities are in California. Washington, D.C. ranked second, followed by Golden Staters Oakland, Irvine, and San Francisco. In contrast, Glendale, Arizona is the least-green city in the report, preceded by Houston; Hialeah, Florida; Meza, Arizona; and Louisville, Kentucky, respectively. **GB**



Cleaned up. Thanks to its reliance on renewable resources to generate energy, San Jose, California topped WalletHub's list of greenest cities for 2025.

CREDIT: COURTESY OF SAN JOSE CLEAN ENERGY AND RENEWABLE AMERICA

Recyclable Wind Turbines Address Life Cycle Concerns

These giant turbine blades can go from generating wind power to carrying luggage.

A new type of wind turbine blade that can be recycled at the end of its operational life has been developed by turbine developer Siemens Gamesa. The 354-foot "RecyclableBlades" are made using a type of resin that can be broken down to allow materials to be reused when their usefulness at land or sea is over, according to plant director Andy Sykes.

Wind turbine blades have an operational life of up to 30 years out at sea, but there are concerns about what happens to them once defunct, Sykes notes. Because the industry has not been able to easily recycle wind turbine blades upon decommissioning, some blades are ending up in landfills. "The new technology will allow valuable glass fiber and carbon fiber components to be used in the future," he says. "The things that are left behind can be used in car parts, bike helmets and perhaps for making suitcases."



Dual-purpose product. Siemens Gamesa's RecyclableBlades can function for about 30 years, then be repurposed into everyday items such as car parts, bike helmets and suitcases. CREDIT: COURTESY OF SIEMENS GAMESA

Offshore turbine company RWE is Siemens Gamesa's first customer, installing 50 turbines at its Sofia offshore wind farm near Yorkshire, England. When completed in 2026, the 1.4-gigawatt facility will generate enough energy to power 1.2 million homes, according to RWE Chief Operations Officer Thomas Michel. **GB**



Market Intelligence That Drives Sales

In today's volatile housing market, gut instinct isn't enough. To outpace competitors, win buyer loyalty, and future-proof your business, you need real-time intelligence that reveals what's driving decisions right now.

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Sustainability has gone transactional. It's no longer a "nice-to-have" — it's baked into every project, purchase, and investment decision. COGNITION Smart Data helps you understand and navigate market dynamics so you can optimize all aspects of your business.

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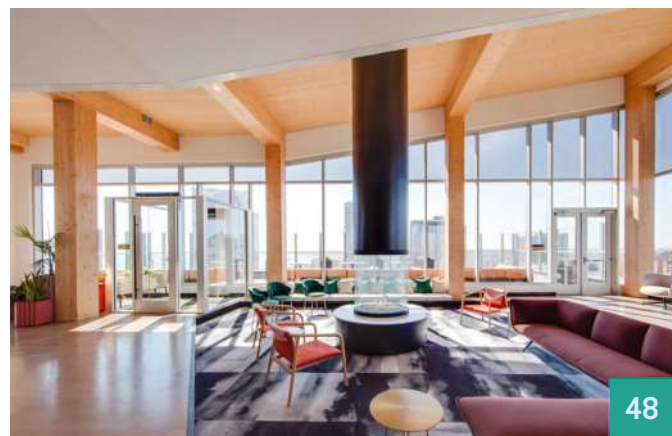
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"Zoning codes were originally based on race, but in more recent years they're based on class. People realize that some of the codes are written to keep poor people out of various neighborhoods. If cities don't address this, the state will do so." [PAGE 36](#)

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Point of Convergence

Federal rollbacks are threatening decades of progress with housing affordability, sustainability and climate resilience, but the demand for high-performance, healthy, net zero-ready homes is accelerating.

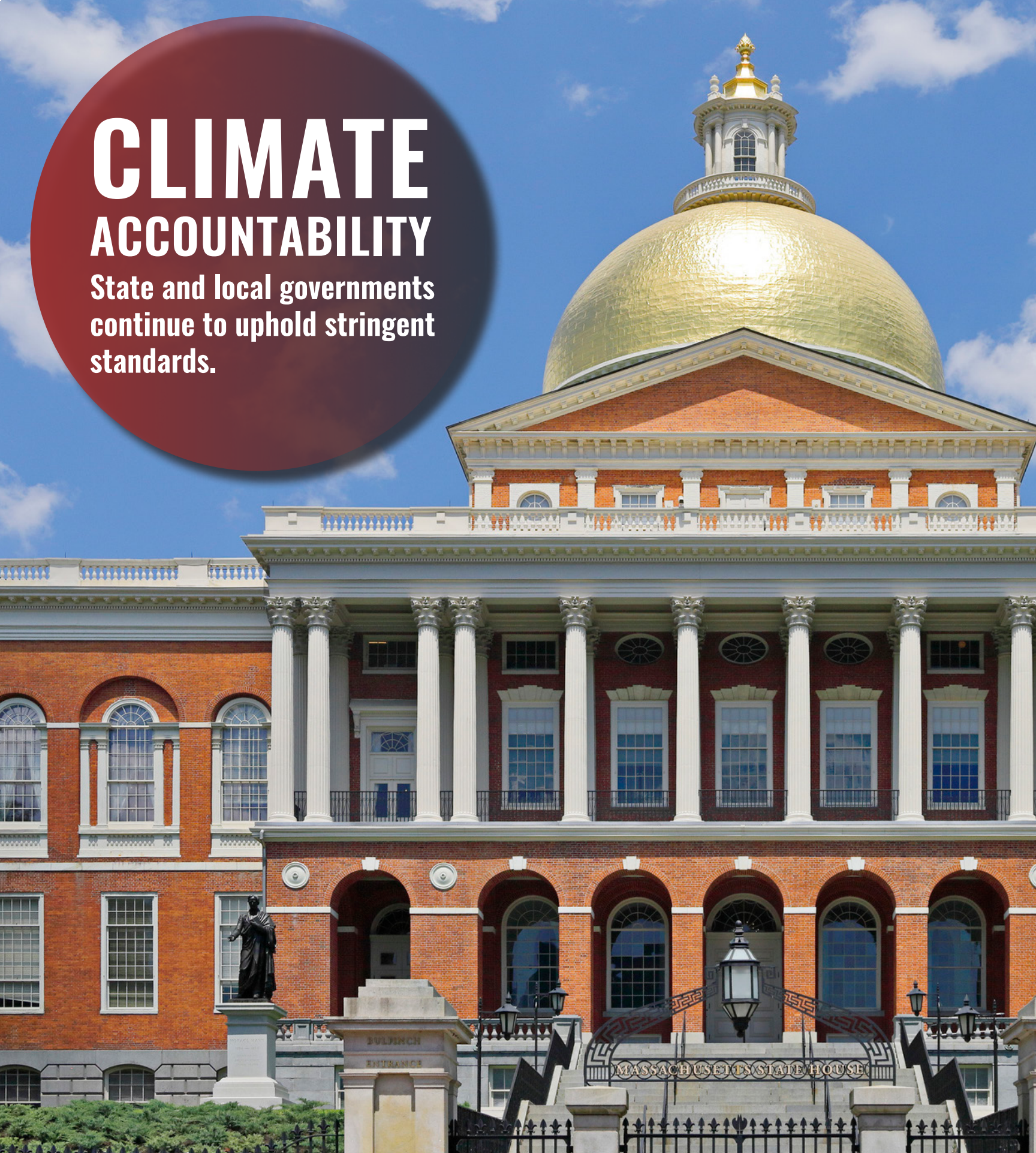
BY SARA GUTTERMAN

The year 2025 has been tough for the housing sector. Market uncertainty, high mortgage rates, erratic tariffs, mounting product costs, continued labor challenges and federal headwinds have led to sluggish home sales and hampered housing starts.

Fortunately, there are signs of relief on the horizon. Economic projections indicate that the market will begin to ease in 2026, driven by a combination of declining mortgage rates (expected to fall to around 6 percent by year's end), pent-up demand (forecasted to fuel an 8 percent rise in home sales), and loosening inventory constraints as the "lock-in effect" fades and sidelined buyers—specifically Millennials and Gen Zs—reenter the market. These trends point toward gradual stabilization and renewed activity in the housing sector next year.

CLIMATE ACCOUNTABILITY

State and local governments
continue to uphold stringent
standards.



Real numbers. Massachusetts' Large Building Energy Reporting (LBER) policy requires owners or agents of buildings over 20,000 square feet to report their energy usage to ensure that consumption data correctly reflects energy efficiency.

CREDIT: ISTOCK/S. GREG PANOSIAN



Despite federal headwinds, state and local governments are advancing robust environmental standards. The 2024 International Energy Conservation Code (IECC) introduces significant updates, including requirements for operational carbon rating and energy reporting.

States such as California and Massachusetts are leading the charge in mandating comprehensive greenhouse gas (GHG) emissions disclosures for large buildings, emphasizing transparency and accountability in carbon emissions.

In California, the Climate Corporate Data Accountability Act (SB 253), signed into law in October 2023, requires U.S.-based entities with over \$1 billion in annual revenue doing business in the state to annually report their Scope 1 (direct), Scope 2 (indirect from consumed energy), and Scope 3 (indirect upstream and downstream) GHG emissions.

The reporting for Scope 1 and 2 emissions is set to begin in 2026, with Scope 3 emissions reporting commencing in 2027. This legislation aims to provide a clearer picture of corporate carbon footprints and drive reductions in emissions across entire value chains.

Massachusetts has implemented the Large Building Energy Reporting (LBER) policy, requiring owners or agents of buildings over 20,000 square feet to report their energy usage, including sources such as oil, propane, wood, and onsite renewable energy generation. This policy ensures that energy consumption data is publicly disclosed, promoting energy efficiency and aiding in the state's climate goals.

Similar statutes are being enacted in states such as New York, New Jersey, Oregon, Washington, and Colorado. These state-level initiatives underscore a growing trend toward rigorous environmental accountability, compelling large building owners to assess and mitigate their carbon emissions proactively. While the policies are currently focused on commercial buildings, it's only a matter of time before they are applied in some manner to the residential sector.

Because of these emerging regulations, new risks are materializing for stakeholders throughout the building industry, such as non-compliance fines, permitting delays, and reputational damage.

Yet, many builders and developers lack the tools to measure, let alone mitigate, embodied carbon. This underscores the need for enhanced carbon accounting tools that evolve alongside new mandates that can provide real-time insights.

Fortunately, such tools are being developed, such as new ANSI standard 1550, titled "Standard for the Calculation and Labeling of the Embodied Environmental Impacts of Dwelling Units Using the Environmental Performance Index." This standard will define the scope for calculating embodied carbon and provide a methodology for conducting calculations for residential projects. The standard is currently under development and is expected to be released sometime in 2026. **GB**



PRACTICE MAKES PERFECT

Consumers' demand for sustainability continues.

According to a recent [report](#) published by Harvard University, products with sustainability labels—such as Amazon's "Climate Pledge Friendly," Target's "Target Zero," and Wayfair's "Shop Sustainably"—simply sell better.

The study, which compared sales rankings for thousands of sustainably labeled products with those of comparable, non-labeled products, found that the labeled products had 13-14 percent increased demand. This was regardless of the type of product, pricing strategies (changes in base price, coupons or discounts), or advertising activities.

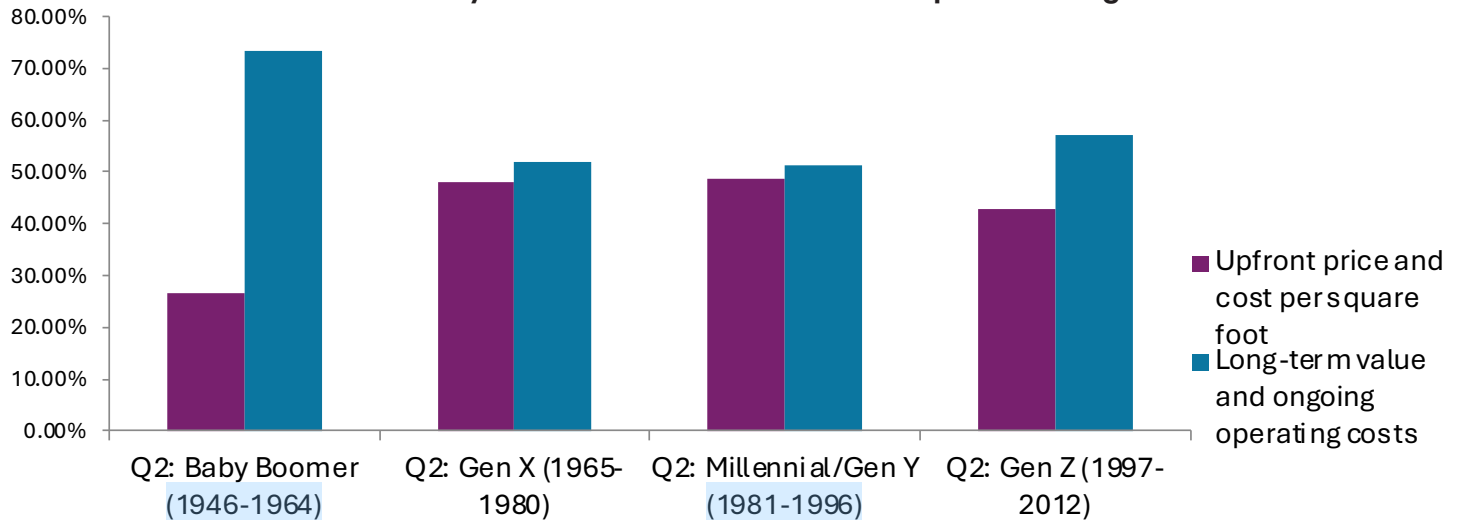
The verdict: Sustainability drives consumer demand at all price points and in all categories throughout the economy, and features such as reduced carbon footprint, the absence of harmful ingredients, and organic production consistently stimulates buying behavior.

Green Builder Media's COGNITION Smart Data confirms the Harvard findings, showing that:

- More than 70 percent of consumers consider sustainability a key factor in their purchasing decisions.
- More than 75 percent of consumers report that they are "somewhat likely" or "very likely" to purchase a product from a company with strong sustainability practices versus one without.
- Nearly 60 percent believe that companies with a strong sustainability focus are more likely to have long-term financial success than those without.
- Seventy-five percent have stopped purchasing products because of concerns over a company's sustainability practices.
- Nearly 80 percent believe that a company's sustainability practices impact the quality of its products or services.

Furthermore, Green Builder Media has been surveying the consumer audience for 20 years. For the first time, all four generations that influence the housing market—Boomers, Gen Xers, Millennials and Gen Zs—report that they are now looking more at total value of homeownership and ongoing operating costs than at upfront price and cost per square foot when making home buying decisions.

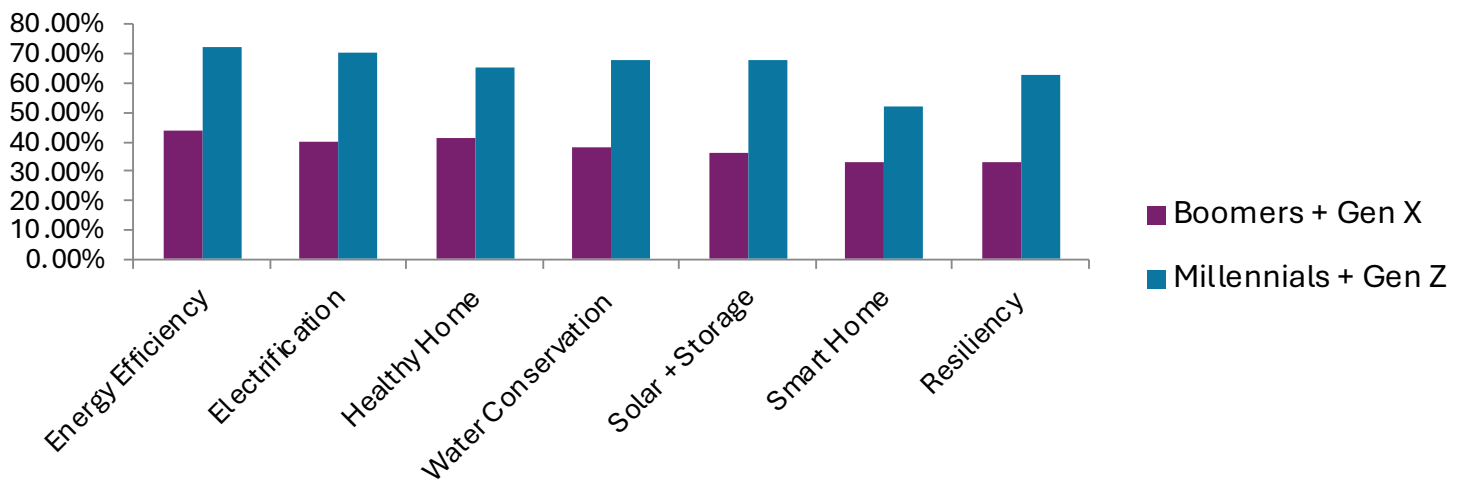
Which are you more focused on when purchasing a home?



SOURCE: GREEN BUILDER MEDIA/COGNITION

Additionally, the majority of Millennials and Gen Zs say that they will pay for sustainability upgrades in areas such as energy efficiency, electrification, healthy home, solar + storage, and resiliency if those upgrades will lower their operating costs over time.

Will pay for sustainability upgrades that lower ongoing cost of homeownership.



SOURCE: GREEN BUILDER MEDIA/COGNITION

Younger generations aren't just different—they're driving systemic socio-economic change. They don't want a bigger house; they want a smarter one. More brains, less bling. More green, less glam. They want homes that are healthy, affordable to run and aligned with their values. They are less focused on the McMansion style of a "dream home" as a status symbol and more concerned with functionality, health and sustainability. **GB**



ELEPHANT IN THE ROOM

The S&L crisis of the 1980s ushered in a new method of home valuation—to the detriment of buyers.

Mixed blessing. The savings and loan crisis of the 1980s dismantled localized lending and turned homes into investment vehicles, which became the dominant funding source for large builders. CREDIT: ISTOCK/ILEMANNA

While the momentum toward a decarbonized built environment is undeniable, one significant barrier continues to impede full transformation: We are still valuing homes the wrong way.

For most of the 20th century, the American housing market was fundamentally local. Small and mid-sized builders worked hand-in-hand with local banks and savings-and-loans (S&Ls) to finance homes for families in their communities. This system created a virtuous cycle: Homes created wealth for local families, which in turn strengthened local banks, which then reinvested into the same communities. Homebuilding was an engine of economic growth and a foundation for community stability and generational wealth creation.

That system began to unravel with the S&L crisis of the 1980s, which dismantled localized lending and ushered in a new era of housing financialization. Wall Street entered the sector at scale, commoditizing homes into investment vehicles. Capital markets

became the dominant funding source for large builders, and institutional investors quickly learned how to extract value from housing in the form of quarterly profits and shareholder returns.

This shift transformed the industry's valuation model. Where homes were once evaluated based on their capacity to provide long-term value—stability, affordability and resilience for families and communities—valuations shifted to price per square foot, a crude metric that strips housing of its deeper social, environmental and economic benefits.

The results have been stark. Housing supply has not kept pace with demand, not because of overburdensome zoning requirements or regulations, but because consolidation, speculative investment, and financial engineering have made it more profitable to constrain supply than to expand it. As a result, home values and rents have risen faster than wages, while ownership rates have declined. Communities once anchored by locally owned housing now find themselves increasingly controlled by distant capital.

TWIN FAILURES OF FINANCIALIZATION

This financialized model suffers from two systemic failures that continue to constrain the sector today:

- 1. Sustainability is excluded from valuation.** By ignoring performance, resilience, intelligence and health, the current model incentivizes homes built to the bare minimum code—essentially the lowest-performing homes legally allowed. This

omission burdens homeowners with higher operating costs for utilities, insurance, and maintenance, while limiting the ability for homes to withstand intensifying climate events.

2. **Consumer demand has evolved, but home valuation has not.** Consumers now factor sustainability into home buying decisions, but appraisals, mortgage underwriting, and valuation models have not kept pace—they continue to undervalue the very features that consumers are demanding. This misalignment means the housing market is consistently underdelivering, leaving both buyers and builders shortchanged.

MAKING SUSTAINABILITY TRANSACTIONAL

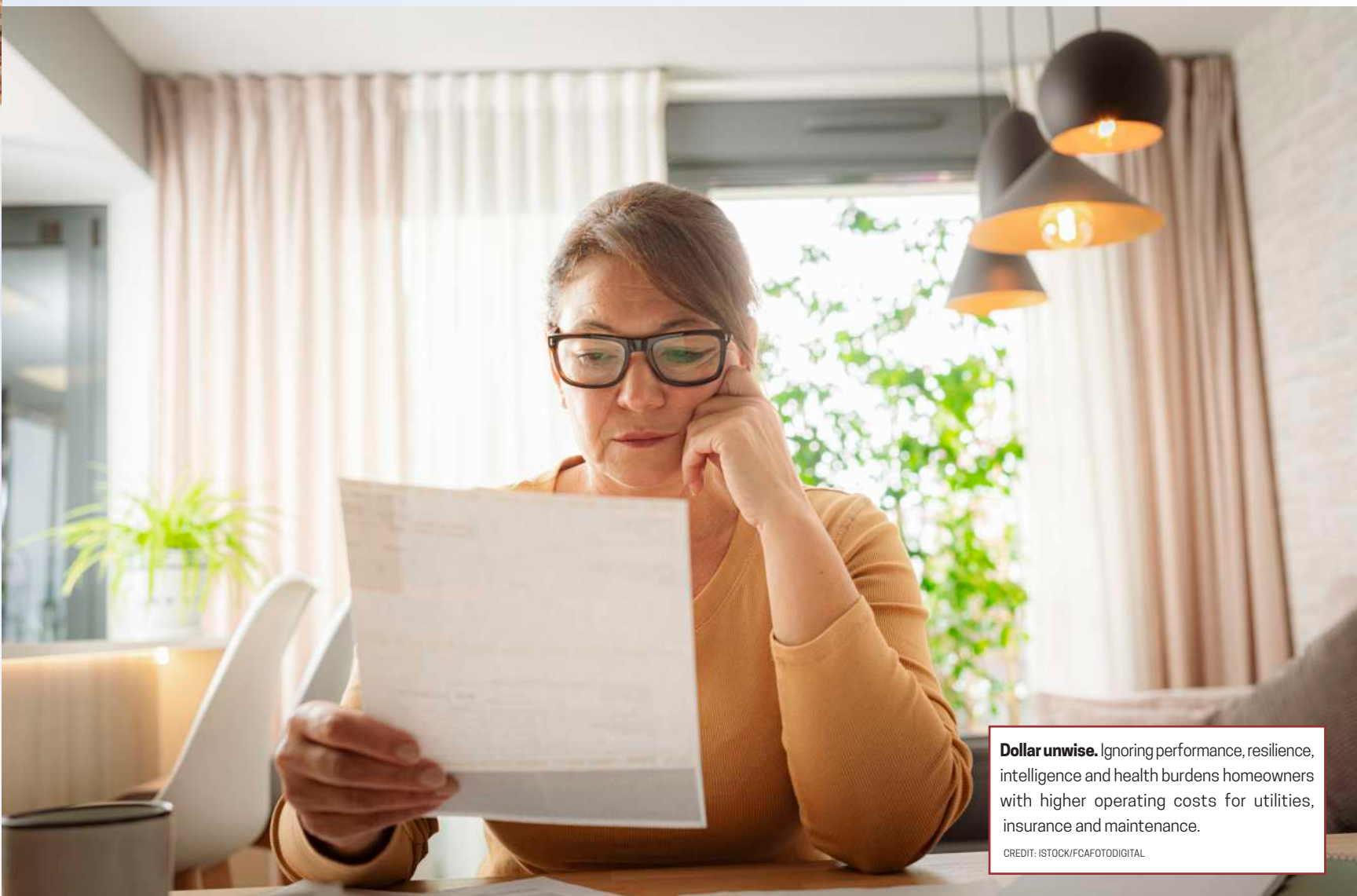
To correct this imbalance, sustainability must shift from a “nice-to-have” feature that can be extracted in down markets, to a transactional, non-negotiable component that elevates home valuation.

This transformation requires that sustainability is embedded into

every stage of the housing lifecycle:

- **Design:** Right-sized, efficient layouts that minimize waste and maximize livability.
- **Product specification:** Prioritizing high-performance, resilient, healthy materials such as heat pump technologies, smart panels, renewable energy systems, whole-home air filtration systems, resilient exterior products and water-conserving technologies.
- **Construction:** Expanding offsite, prefab, and modular approaches that cut waste by up to 90 percent while ensuring precision and quality control.
- **Operations:** Leveraging solar + storage, demand-side energy management, and connected technologies to lower energy costs, improve comfort and enhance resilience.
- **End-of-Life:** Designing for disassembly, recyclability and carbon sequestration.

When sustainability is embedded in these processes, homes shift from being short-term assets to long-term value creators. **GB**



Dollar unwise. Ignoring performance, resilience, intelligence and health burdens homeowners with higher operating costs for utilities, insurance and maintenance.

CREDIT: ISTOCK/FCAFOTODIGITAL

Everlasting bargain. Under the right market conditions, homes with performance features sell faster, command higher premiums, and generate stronger brand equity.

CREDIT: ISTOCK/EONEREN



Basic economics teaches us that value creation translates into profitability. A high-performance home that reduces utility and insurance costs by \$400 per month saves more than \$140,000 over the life of a typical mortgage. Homeowners increasingly recognize this tradeoff and are willing to invest more upfront in exchange for long-term savings and peace of mind.

Given the right market conditions, homes with performance features sell faster, command higher premiums and generate stronger brand equity. Warranty claims decline when homes are constructed with precision and better materials. Investors and

THE ECONOMICS OF VALUE CREATION

For builders, sustainability shouldn't be viewed as a drag on margins, but rather as a profit driver.

lenders increasingly reward companies that demonstrate resilience and reduced risk exposure. And many municipalities are expediting permits and offering better land deals to builders and developers that have strong sustainability and decarbonization plans.

Builders such as Beazer, KB, Lennar, and Mattamy who have embraced sustainability—and are holding firm to their commitments even in a down market—are proving that they can unlock new profit pathways.

Put simply, by shifting from “cost per square foot” to “value per square foot,” builders can differentiate themselves and avoid the destructive race to the bottom that characterizes commoditized markets and purely price-driven competition.

BROADENING THE STAKEHOLDER CIRCLE

Builders cannot achieve this transformation alone. Other housing stakeholders must step in to redefine the valuation equation. The shift will take appraisers accounting for energy efficiency, health outcomes and resiliency when valuing homes, and realtors highlighting sustainability benefits in their marketing to help buyers understand long-term value.

Lenders will play a pivotal role by incorporating energy efficiency, electrification, resiliency and renewable energy upgrades into mortgages in such a way that a homeowner’s monthly payment doesn’t increase.

Insurers are essential to incentivize resilient construction

Helping hand. Lenders can incorporate energy efficiency, electrification, resiliency and renewable energy upgrades into mortgages in such a way that a homeowner’s monthly payment doesn’t increase. CREDIT: ISTOCK/PHAKPHUM PATJANGKATA



with lower premiums, directly rewarding high-performance homes. And states and utilities will need to ramp up reliable, long-term incentives and rebates for sustainability features that don't fluctuate or sunset in the face of political headwinds.

This kind of collective action would create a housing ecosystem with sustainability embedded into its DNA. In doing so, the burden would no longer fall solely on builders to solve affordability challenges—a dynamic that has too often sacrificed performance, health and resiliency in the name of cost-cutting.

THE COST OF CLINGING TO AN OUTDATED MODEL

The housing sector's fixation on price per square foot is more than

a bad habit—it is a structural liability. By ignoring sustainability, the industry is undervaluing homes, overburdening buyers and leaving billions in untapped profit on the table.

Until sustainability is fully integrated into how homes are designed, financed, built and valued, the industry will continue to deliver housing stock that underperforms, costs too much to operate, and exposes families and builders to unnecessary risk.

In economics, ignoring value creation is the fastest way to erode profit. In housing, it's the surest way to deepen the affordability crisis, lock buyers into costly underperforming homes, trap builders in an antiquated profit model and expose the entire industry to policy and climate risks. **GB**



Lost potential. By ignoring sustainability, the industry is undervaluing homes, overburdening buyers, and losing billions in untapped profit. CREDIT: ISTOCK/MABLEEN

ONE BIG BEAUTIFUL SPEED BUMP



The One Big Beautiful Bill (OBBB) is likely to impede progress within the housing sector, particularly for green building and sustainability initiatives.

- **The 45L tax credit**, originally authorized through 2032 by the Inflation Reduction Act, is set to expire in June 2026. This credit dramatically increased the number of ENERGY STAR-certified homes from approximately 125,000 to 350,000 in the U.S., representing nearly a quarter of all new homes built.
- **The 25C credit**, which offered tax benefits to homeowners for qualified energy-efficient home improvements (like heat pumps and water heaters), will expire on Dec. 31, 2025.
- **Wind and solar incentives** (ITC) are on a faster off-ramp than originally planned in 2032. Now, only projects that break ground before June 2026 or are up and running by the end of 2027 will receive these incentives.
- **Residential solar tax credit** under Section 25D will phase out after Dec. 31, 2025, and eligibility for leased solar hot water and battery storage systems will also be eliminated.
- **Tax credits** for new and used clean vehicles, as well as commercial clean vehicle fleets, already vanished on Sept. 30, 2025. Credits for installing home or commercial charging stations expire on June 30, 2026.

While many clean energy programs face contraction, the nuclear, hydropower and geothermal sectors have been granted a longer runway. Projects that begin construction before 2033 will still qualify for incentives—offering these emerging technologies a crucial window for advancement amid tightening federal support elsewhere. As financial, policy and climate pressures intersect, builders and manufacturers will need to find new ways to preserve momentum in sustainability while maintaining affordability. Even as federal incentives recede, market demand for efficiency, durability and health will continue to expand—driven by consumer expectation, state and local leadership, and private-sector innovation.

KEEP CALM AND CARRY ON

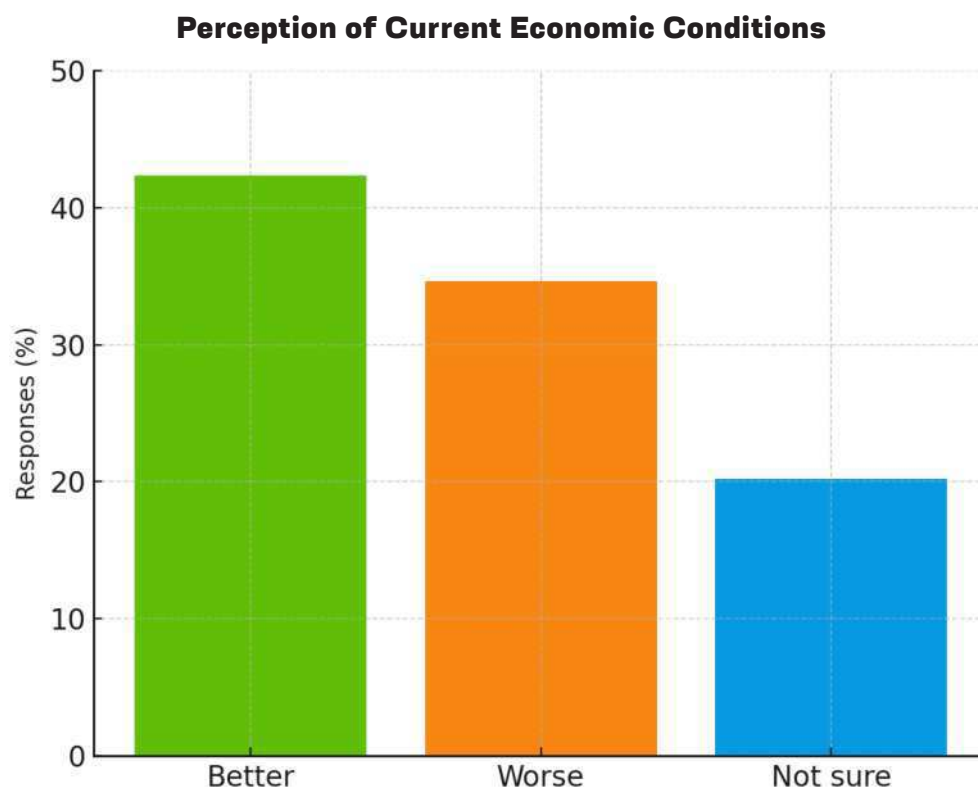
**Alarmed about the economy?
Not today's builders, who vow
to continue green building.**

Even in the face of sunseting incentives and market uncertainty, many leading builders are not raising alarm bells, nor are they walking back from sustainability commitments.

The general consensus: Yes, market conditions are tough, but sustainability is helping to reduce costs, increase profitability, boost competitive advantage and meet buyer demands.

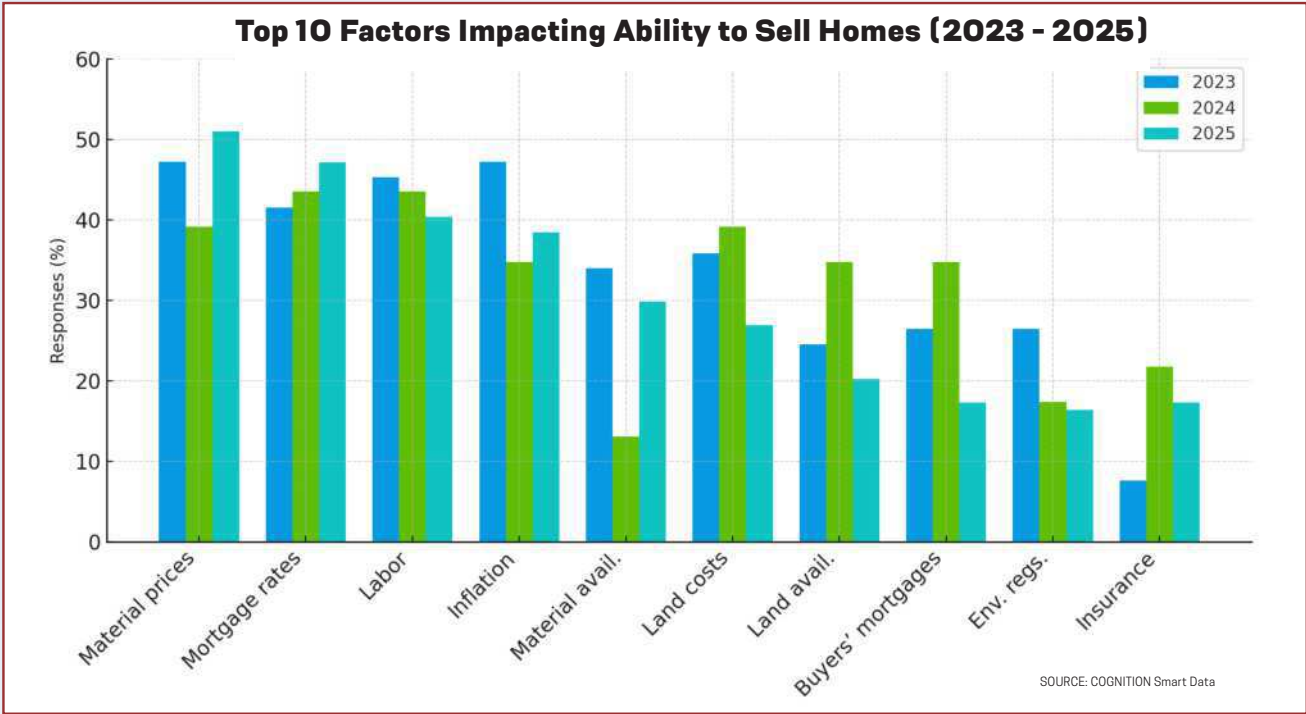
Green Builder Media's annual State of the Industry survey revealed the struggles and successes that builders experienced in 2025.

Approximately 43 percent of builders believe that the economy is getting better, but 35 percent believe it is getting worse.

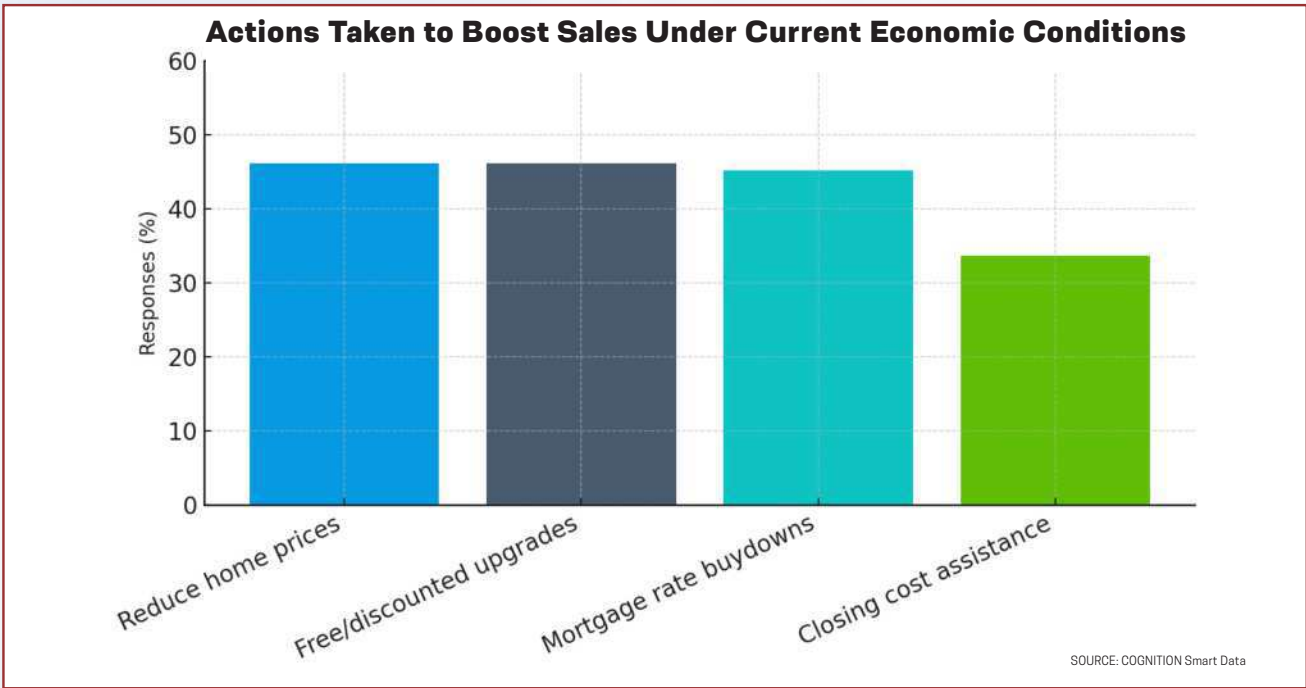


SOURCE: COGNITION Smart Data

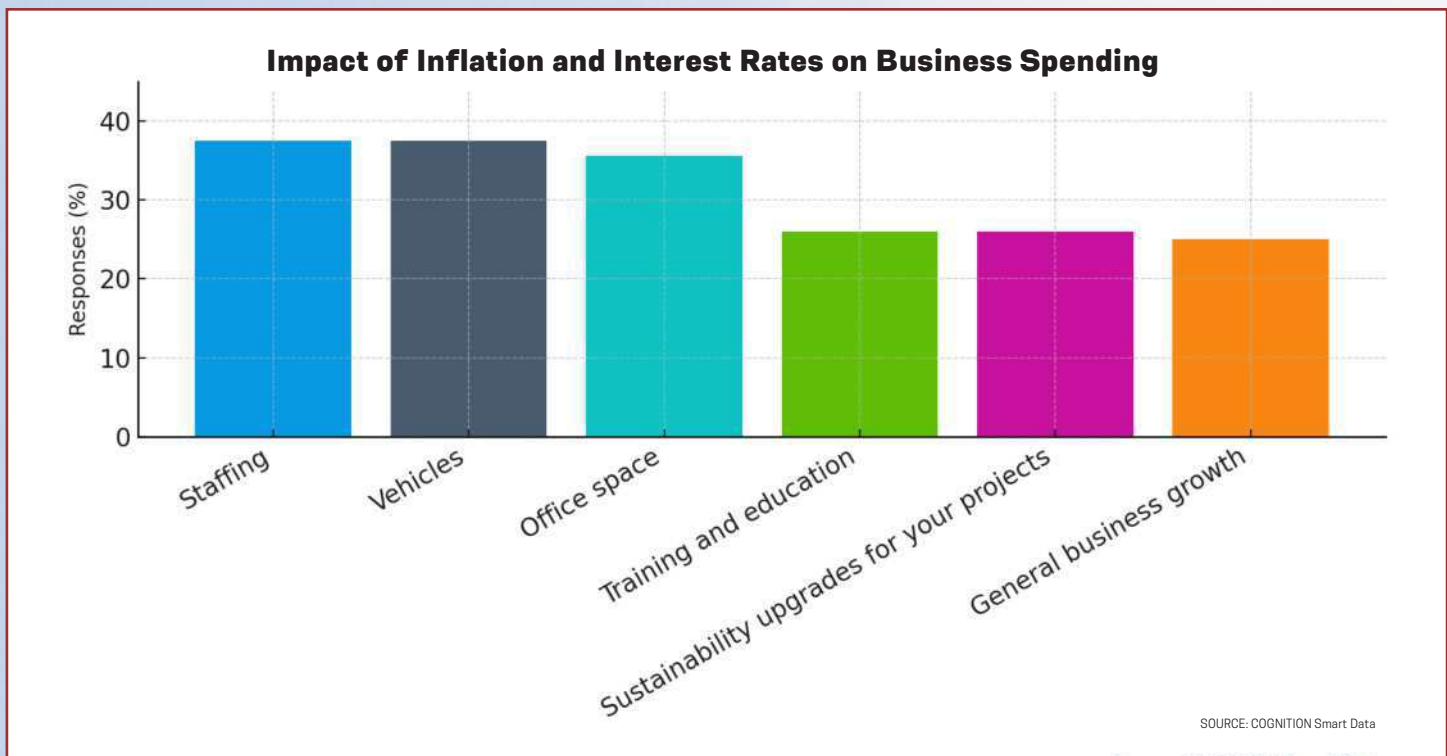
This year, builders report that the top three factors impacting their ability to sell homes are materials prices, mortgage rates and labor shortages. This largely echoes the sentiment in 2024, with marked improvement with respect to land cost, land availability and mortgage challenges they faced in 2023.



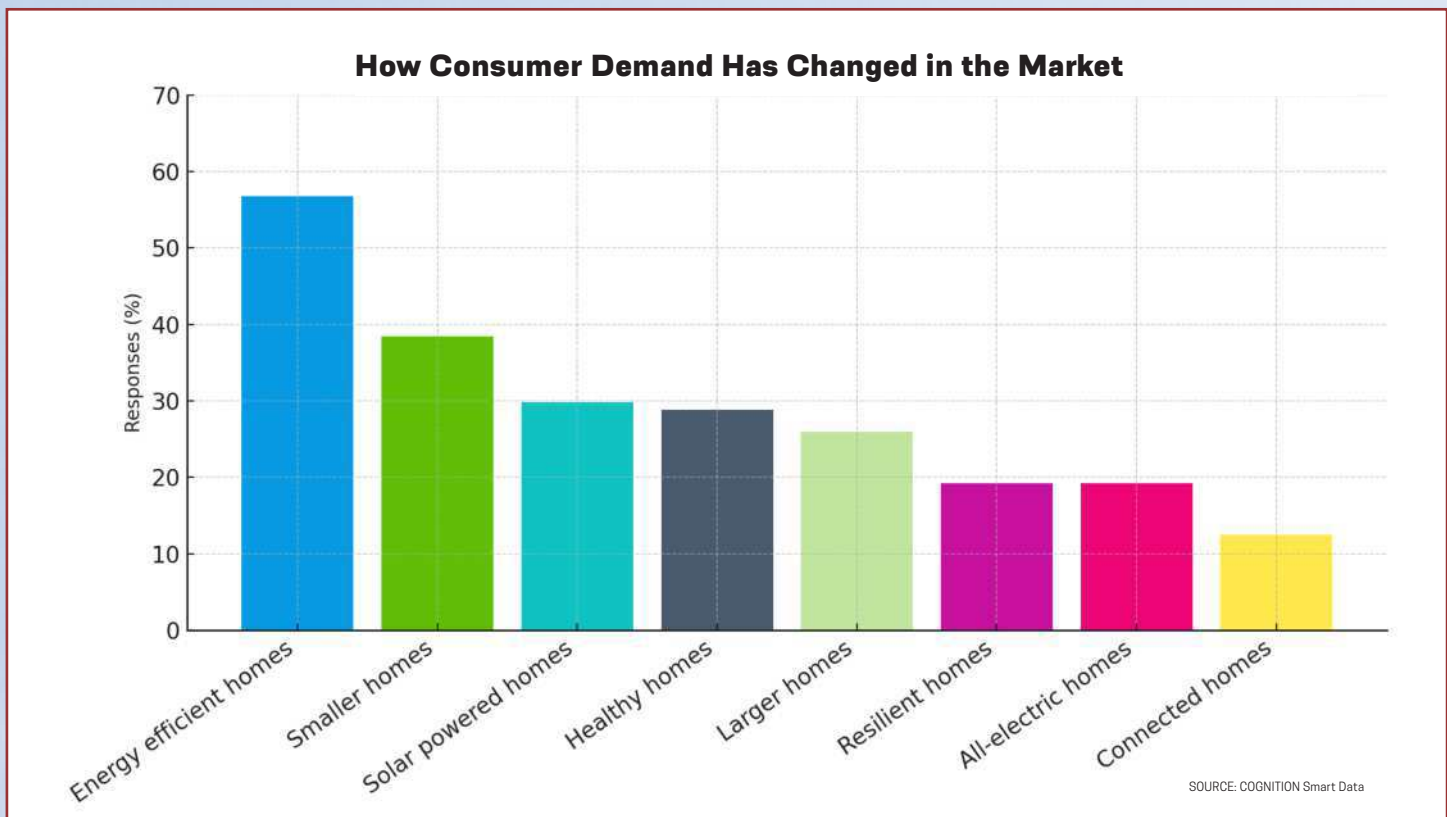
Approximately 45 percent of builders report that they are reducing home prices (by an average of 4-6 percent), offering upgrades and mortgage rate buydowns due to attract buyers.



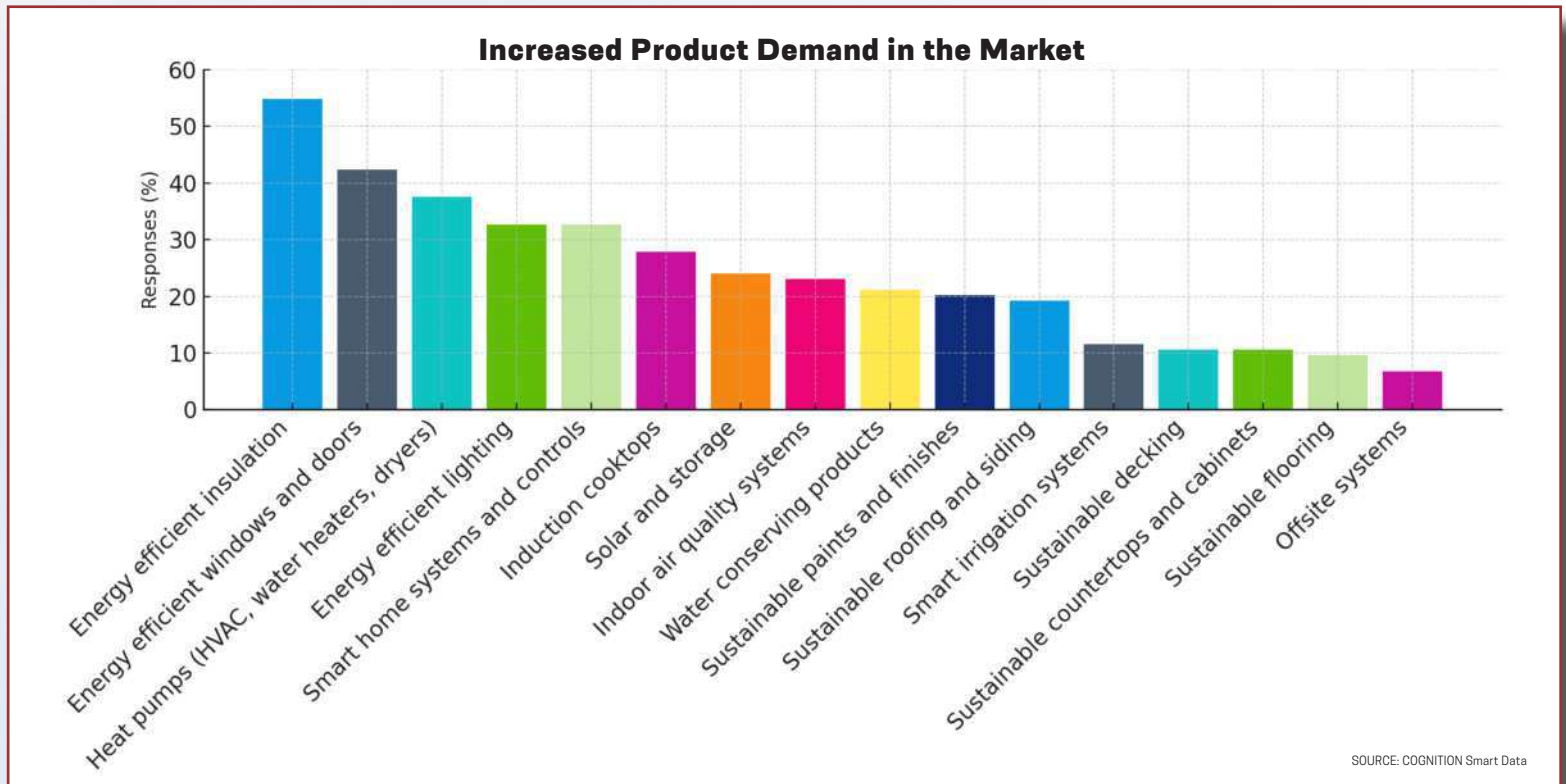
More than 35 percent of builders reveal that high interest rates have caused them to curb spending on staffing, vehicles and office space.



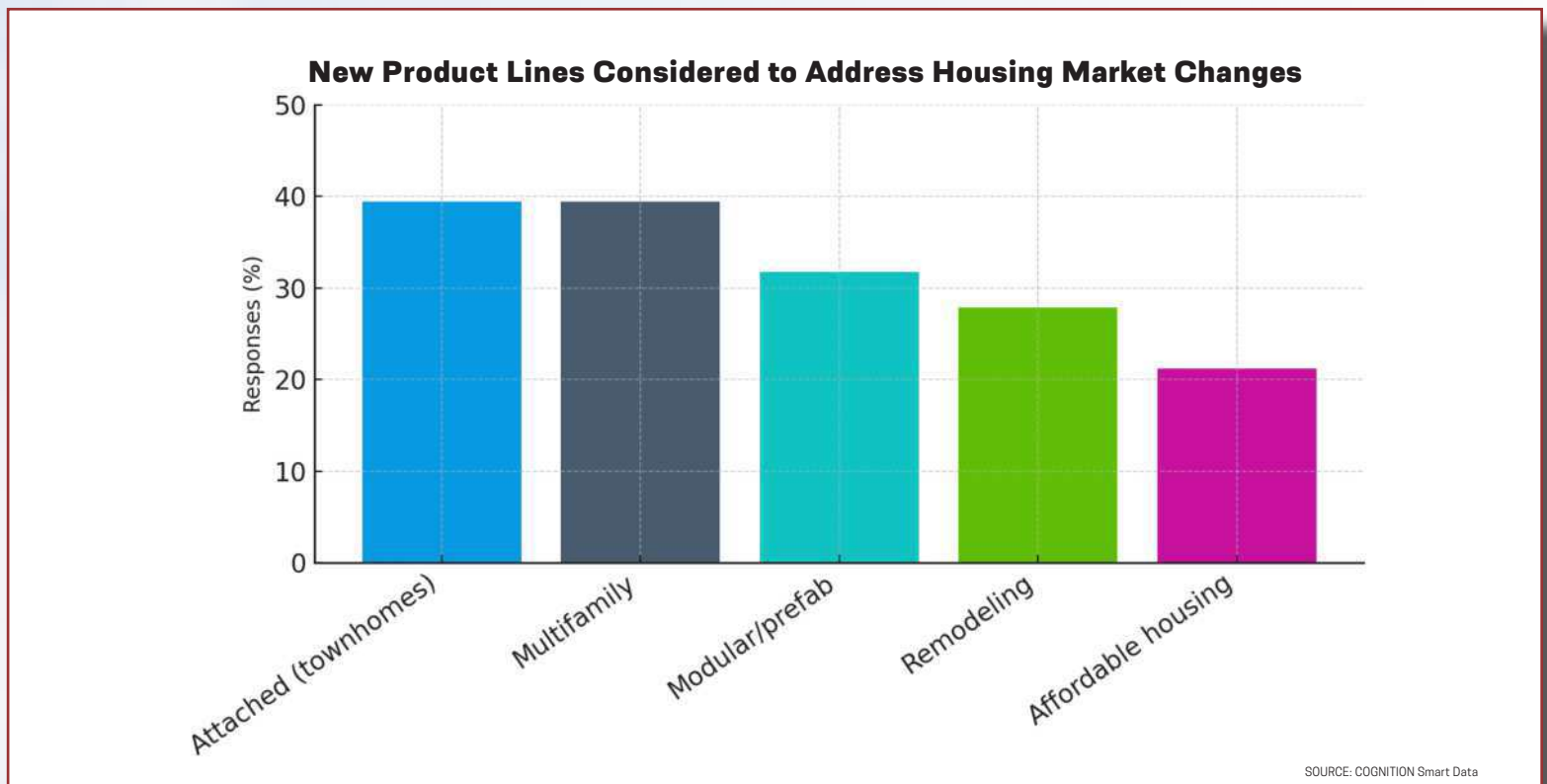
Builders also report that their buyers want energy efficient, smaller homes. They're seeing a demand for energy efficient building envelope solutions such as insulation and windows as well as heat pump technology.



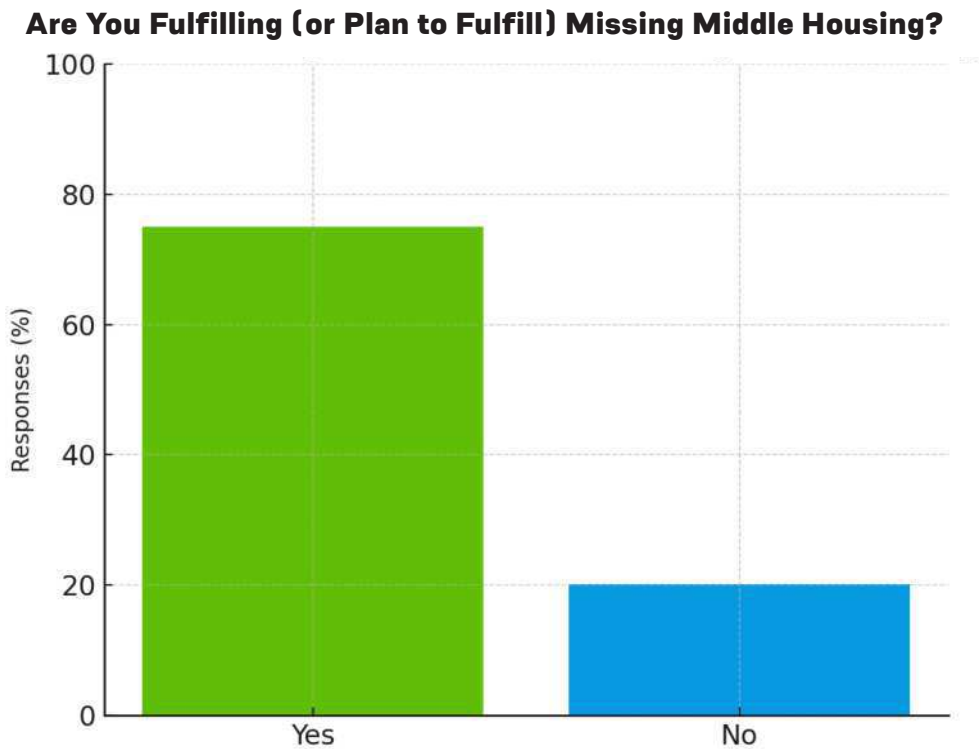
Are you seeing increased demand for any of the following?



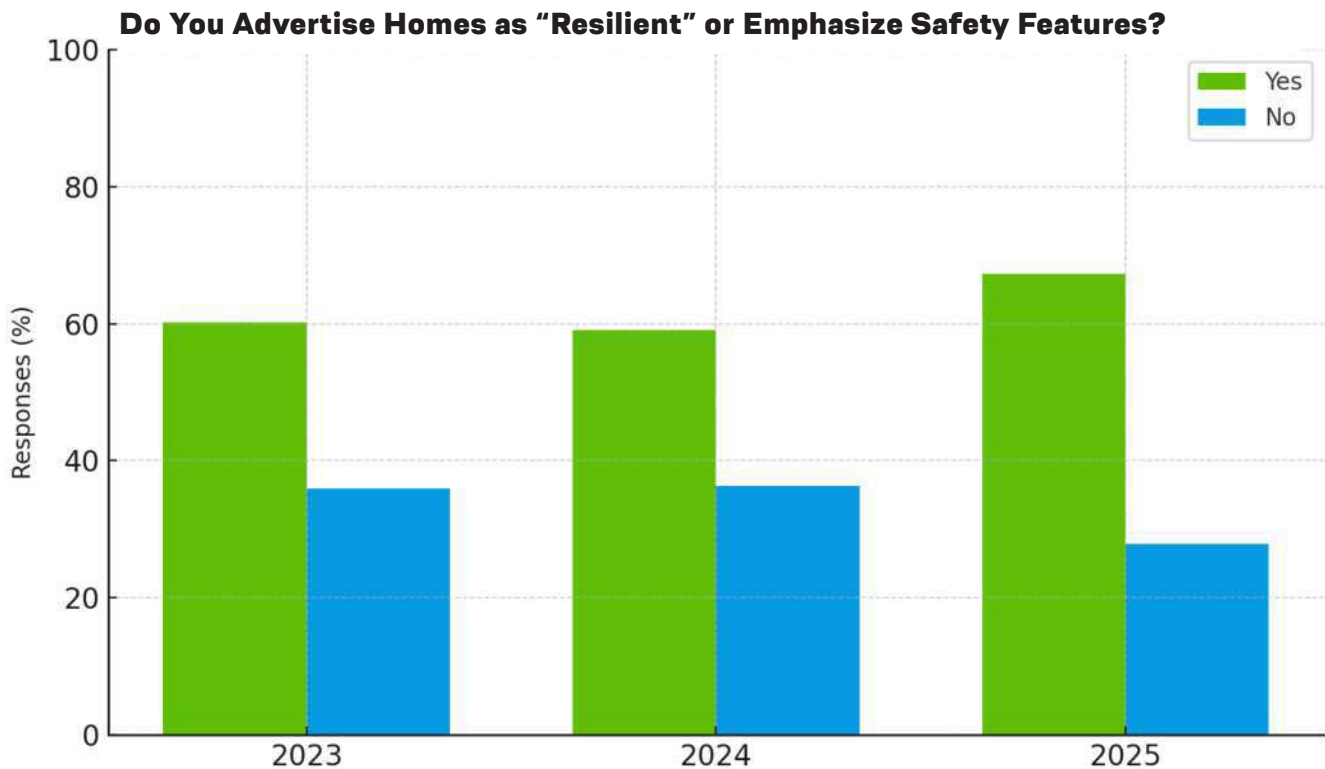
To navigate market uncertainty, builders are exploring new products, namely townhomes and multifamily units. These augment single-family home offerings and provide a wider spectrum of choices that meet today's homeowners' budgets.



Approximately 75 percent of builders report that they are delivering “missing middle” homes that have been severely underbuilt over the past two decades.

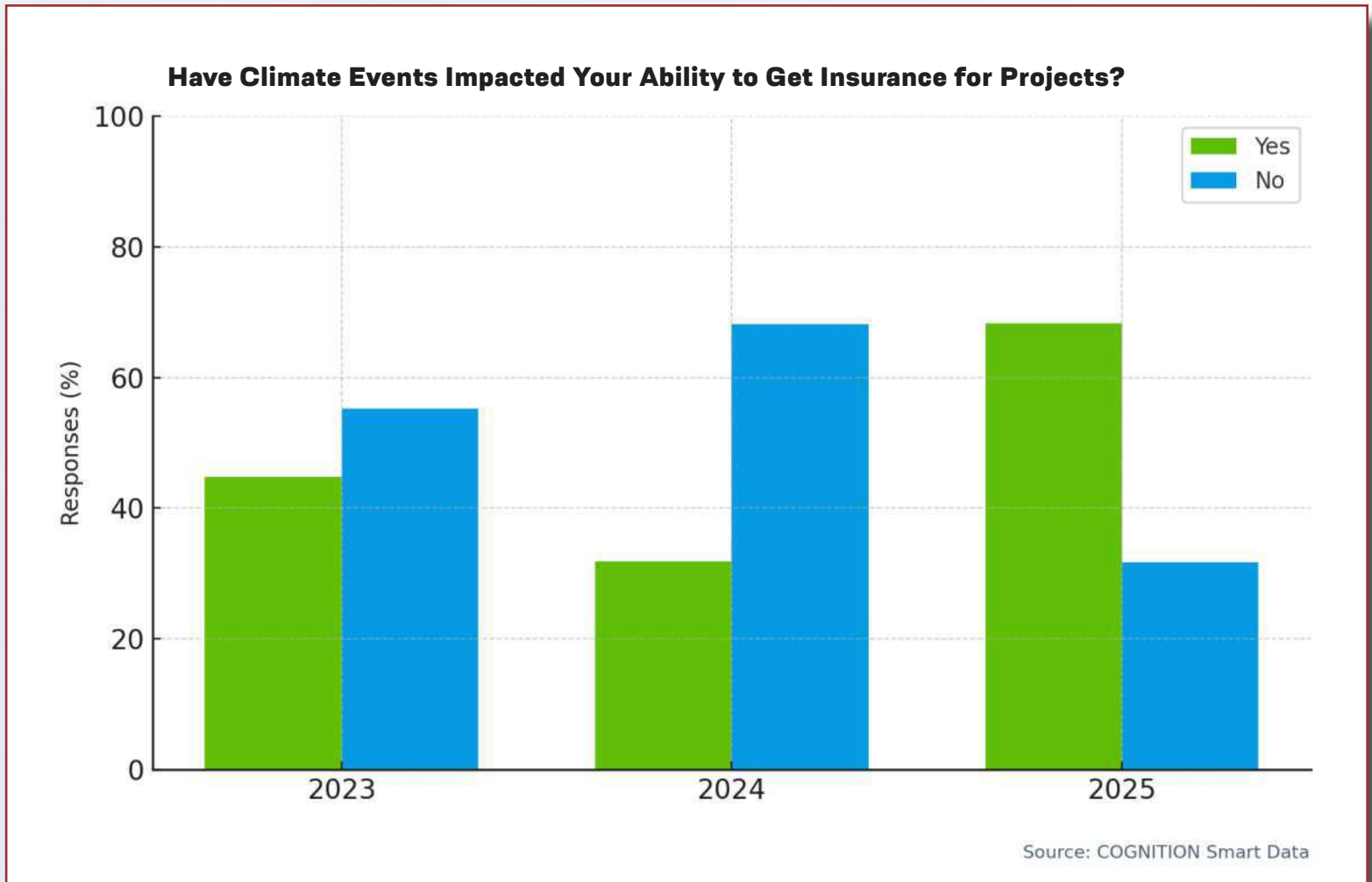


Nearly 70 percent of builders claim that they are promoting their homes as resilient—up from nearly 10 percent from 2024. This reflects the ethos of the market in the face of intensifying climate events.



SOURCE: COGNITION Smart Data

Nearly 70 percent of builders report that climate events have impacted their ability to get insurance from their project—a dramatic increase from last year’s 35 percent response rate.



Builders are also watching the continued adoption of digital tools, prefab construction and performance modeling to stay competitive. Advances in AI-driven design, material science and supply chain analytics are reshaping how they are designing, pricing, and delivering homes.

Labor shortages, though still a concern, are prompting new efficiencies and training initiatives. Builders are investing in workforce development programs, leveraging modular systems, and turning to robotics and automation to offset human resource constraints. These measures improve productivity and enhance build quality, consistency and sustainability outcomes. **GB**

CONSUMERS: BY THE NUMBERS

Headed into 2026, many buyers remain uneasy about mortgage rates, insurance costs and property taxes.

Amid consumers, affordability concerns persist, with many individuals expressing unease about mortgage rates, insurance premiums and property taxes. Yet, even in this constrained financial environment, interest in sustainability and resilience continues to rise.

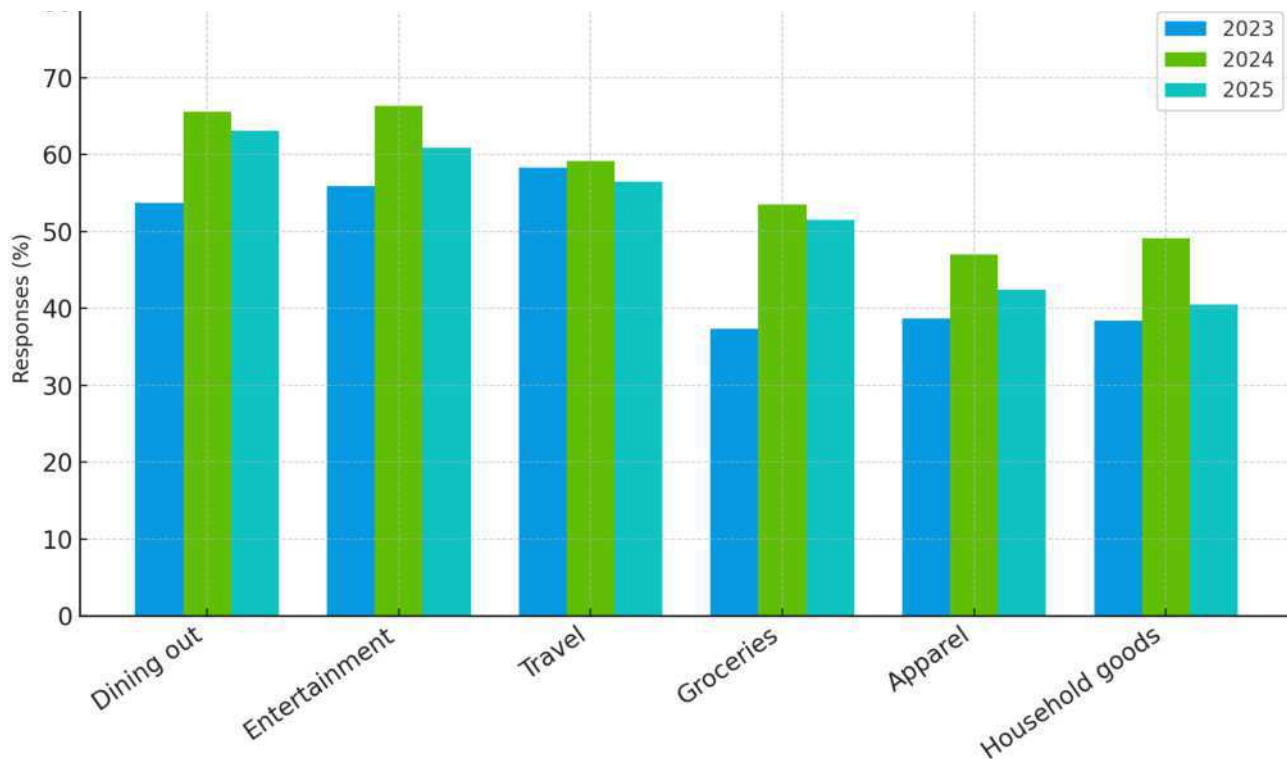
COGNITION data indicates that buyers view energy efficiency, durable construction, and smart technologies as essential—not optional—features. The emphasis on low-maintenance design and total cost of ownership reflects a maturing market mindset: buyers are becoming pragmatic investors, prioritizing what they can sustain rather than what they can simply afford.

This trend aligns with broader macroeconomic realities. With inflation moderating but still elevated, consumers are recalibrating expectations, seeking homes that deliver stability, security, and a sense of permanence.

Here are some key data points:

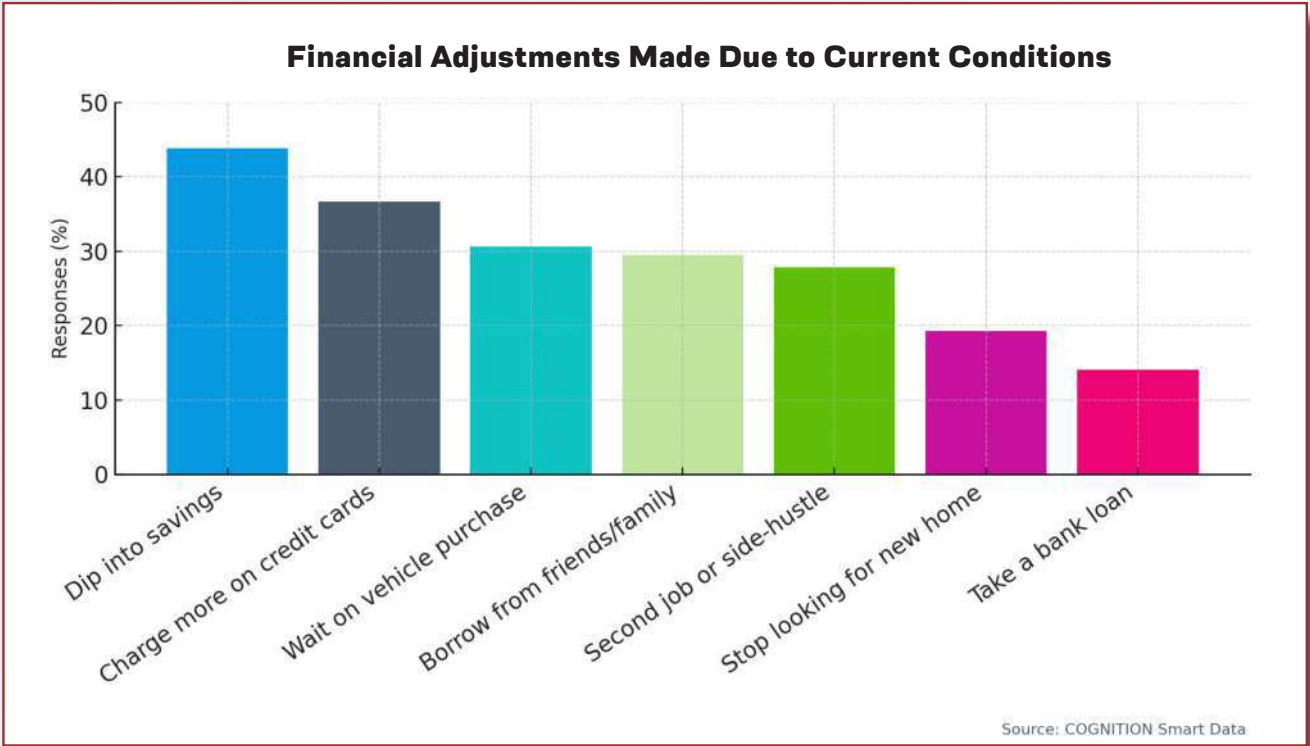
Consumers continue to feel financially pinched, reporting that they are cutting down on dining out, entertainment, travel, and even groceries by an average of 15 percent. However, economic pressures have eased slightly when compared to 2024.

Areas Where Spending Has Been Curbed Due to Inflation and Interest Rates (2023-2025)

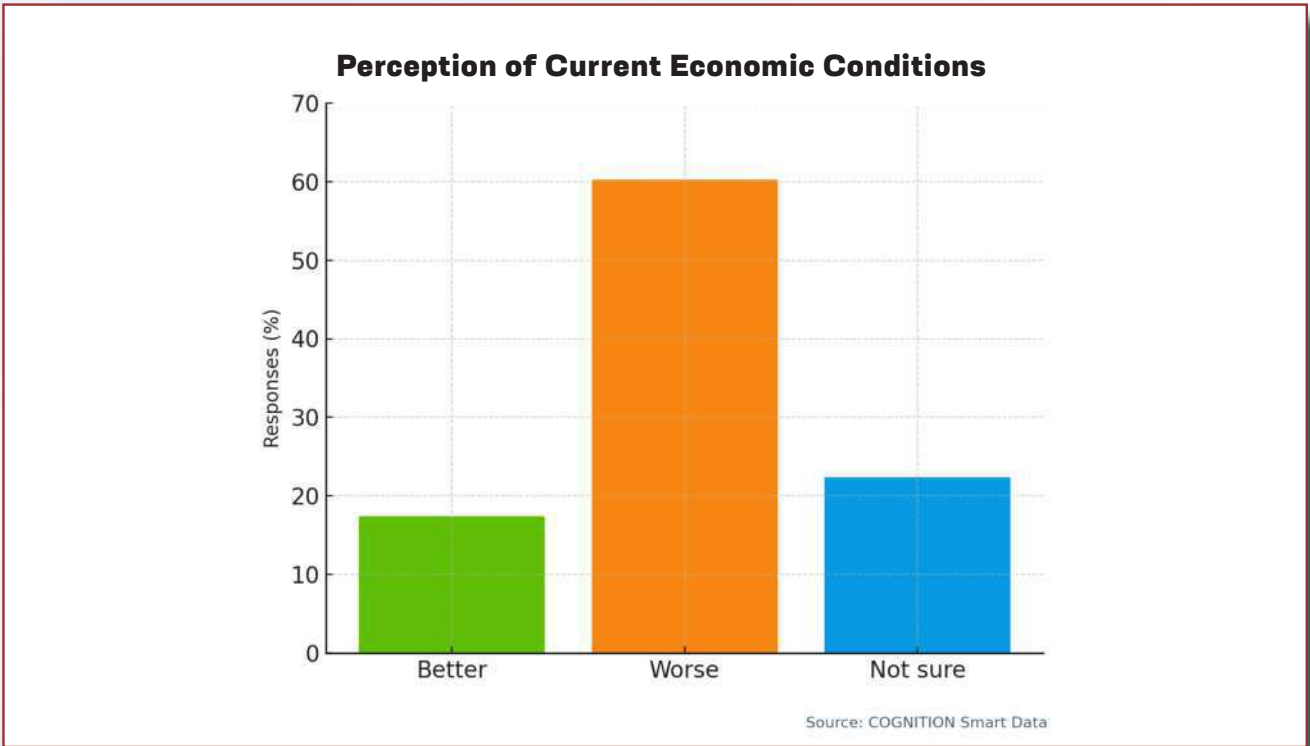


Source: COGNITION Smart Data

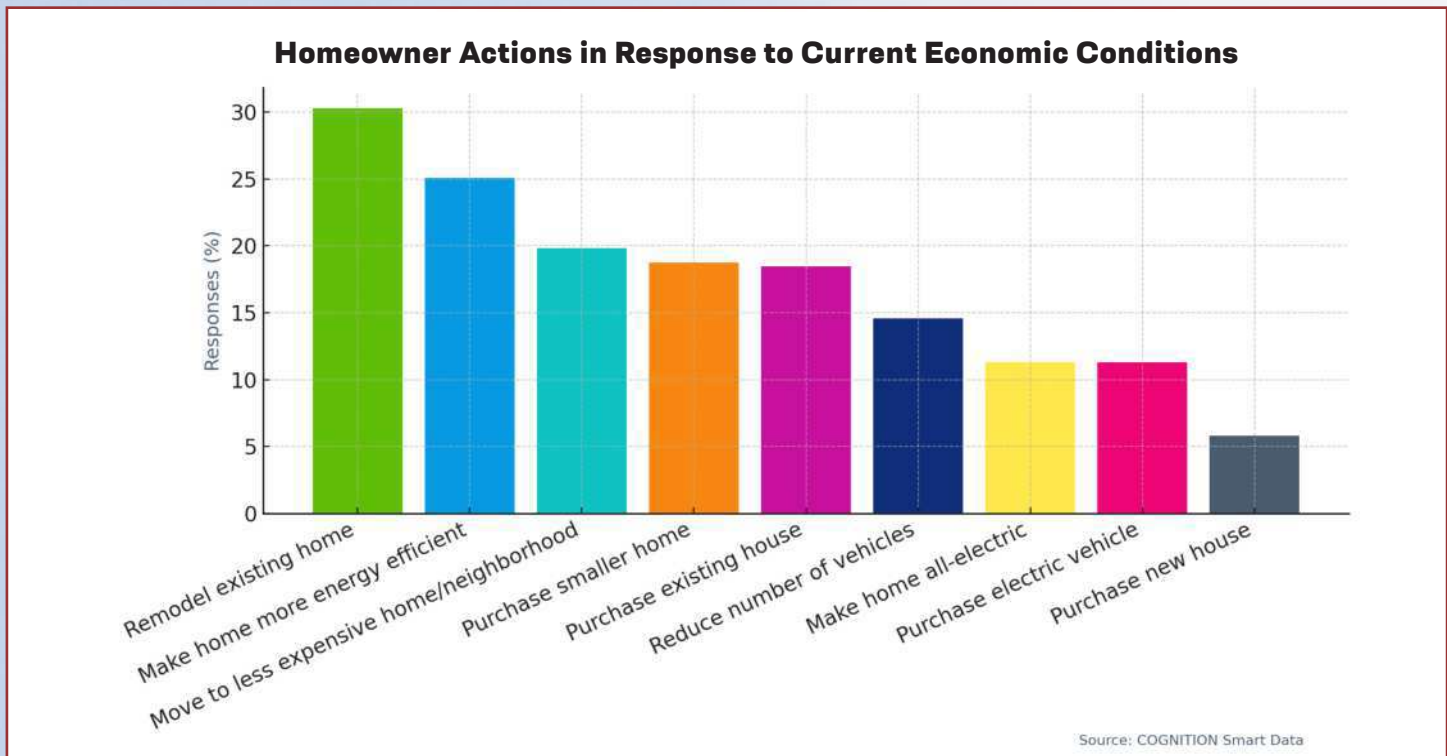
Consumers report that they are having to do things like dip into their savings, charge more on credit cards, wait on purchasing a new vehicle, and even borrow money from friends and family to make ends meet, and they report having difficulty affording daily expenses and utility bills.



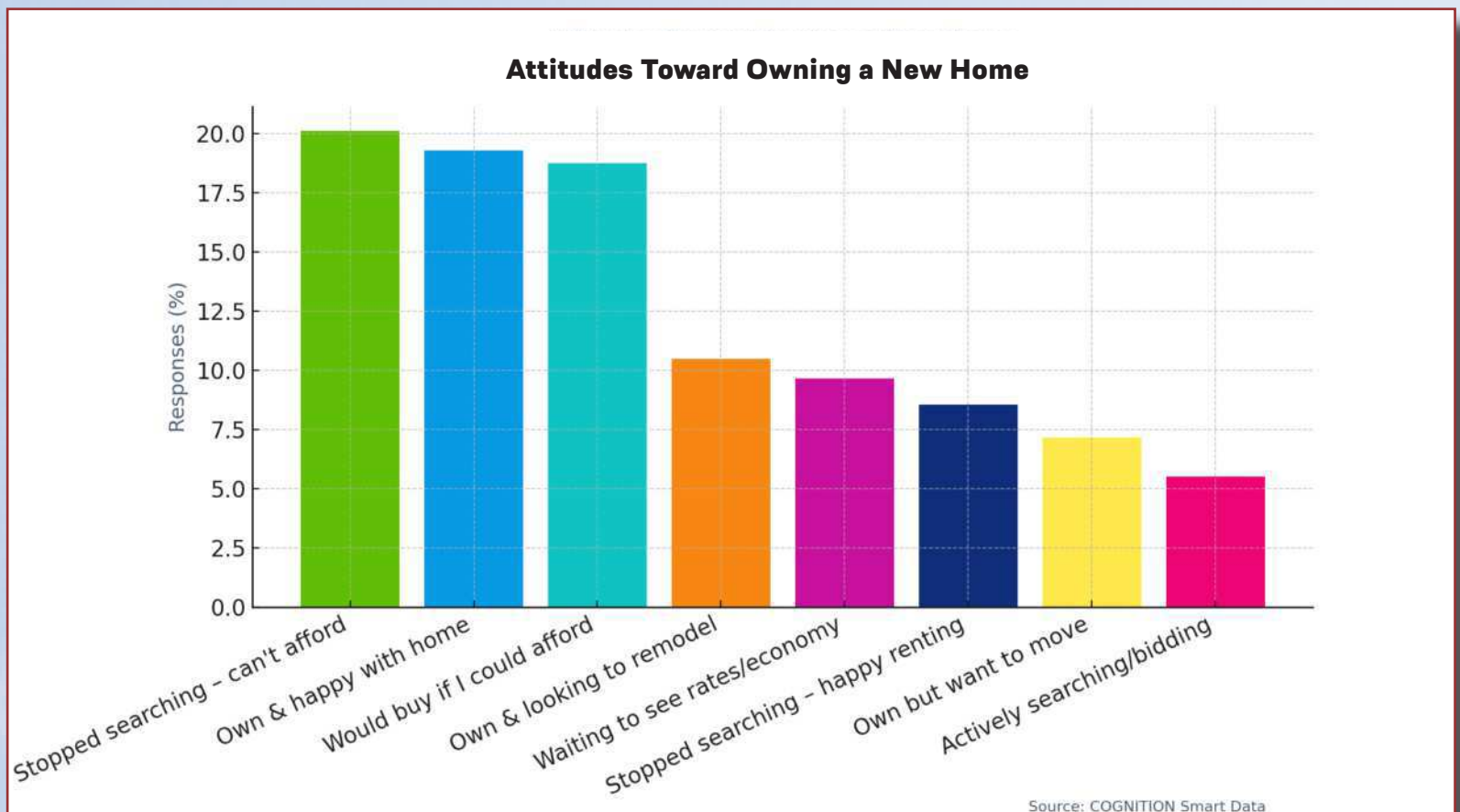
In contrast to the more optimistic builders, 60 percent of consumers believe that the economy is getting worse, while less than 20 percent forecast improvement.



In light of economic conditions, homeowners are looking to take actions such as remodeling their existing homes (as opposed to moving), making their homes more energy efficient, moving to a less-expensive neighborhood, and purchasing a smaller home.



Additionally, due to economic conditions, nearly 40 percent of consumers report that they are sitting on the sidelines due to affordability challenges.



This data reflects a consumer mindset shaped by fatigue and hope. After several years of economic volatility, many Americans are recalibrating their expectations: choosing smaller homes, prioritizing energy savings over luxury finishes, and showing renewed interest in community-based amenities and durability. The preference for “right-sized” homes—spaces that are functional, efficient and easier to maintain—continues to grow as homeowners weigh the long-term benefits of lower operational costs and reduced environmental impact.

Market fundamentals: Balancing pressure and potential

The fundamentals of the housing market remain relatively healthy. Inventory levels are tight, supporting home values even as transaction volumes fluctuate. While the elevated cost of borrowing continues to deter some first-time buyers, others are returning to the market, driven by necessity, family

formation, or the belief that rates will eventually moderate.

The long-term demand picture remains strong: demographic momentum among Millennials and older Gen Zs—and soon Gen Alpha, paired with underbuilding over the past decade, ensures that the market’s core need for new homes will persist. At the same time, builders are sharpening their focus on operational efficiency, environmental performance, and product differentiation, recognizing that resilience in the next housing cycle will depend on smarter, leaner and more sustainable business models.

Looking ahead, the defining challenge will be translating resilience into renewal. As interest rates gradually normalize and consumer confidence rebuilds, the companies that have used this period to strengthen operations, refine products, and deepen customer relationships will be poised to capture growth. **GB**

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The Go Zone

Even with a site zoned for high density, the **VISION House Hickory Grove** overcame obstacles to build workforce housing.

BY MICHELE LERNER



Clear view. VISION House Hickory Grove showcases affordable, comfortable duplex living in North Carolina.



(Wide) open for business. The site for VISION House Hickory Grove is zoned for high density, which allows up to 16 units on the site. But various regulatory issues have slowed the 12-unit project and led to numerous redesigns. CREDIT: HOWARD BUILDING SCIENCE

Dollarwise development. When complete, VISION House Hickory Grove, similar to Howard Building Science's Duke Street Cottages shown here, will provide 12 units of affordable workforce housing.

CREDIT: HOWARD BUILDING SCIENCE



An estimated 4.7 million more units of housing are needed to meet demand in the U.S., according to Zillow's analysis of Census data, a major contributor to the affordability crisis for homebuyers. While numerous factors led to the supply and demand gap, one culprit, particularly for "missing middle" homes, is zoning. Rules that limit density and don't allow for creative solutions such as accessory dwelling units (ADUs), duplexes and triplexes make it even more difficult for attainably priced housing to pencil out for builders.

VISION House Hickory Grove in Hickory, N.C., a partnership between Green Builder Media and Rob Howard, president of [Howard Building Science](#) in Granite Falls, N.C., has bumped up against numerous regulatory challenges during the quest to build 12 units of workforce housing.

The term "missing middle housing," coined in 2010 by [Opticos Design](#) founder Daniel Parolek, refers to a range of housing options

between single-family homes and large apartment buildings that are generally absent in housing markets throughout the U.S. Missing middle homes can be in any price range and include duplexes, triplexes, small multifamily buildings or clusters of smaller homes in pocket neighborhoods or cottage communities. Increasing the supply of sustainable homes in walkable neighborhoods is a goal of the missing middle movement.

Sometimes "missing middle" is used interchangeably with "workforce housing," but they're not always identical concepts. Workforce housing is typically defined as rental or for-sale homes designed to be affordable to people earning 80 percent to 120 percent of area median income. Often people in that income range earn too much to qualify for subsidized housing but are priced out in markets where rents and home values are high. Some examples of people who could benefit from a larger supply of workforce housing include recent college graduates, teachers, first responders and lower-paid healthcare workers. Missing middle housing can increase options for workforce housing.

A "NOT IN MY BACKYARD" REVIVAL?

On paper, missing middle and workforce housing sound like a great solution to ease housing woes. But in communities all over the U.S., zoning codes and other regulations limit their viability.

"The No. 1 reason that missing middle housing is so difficult to build is that it's basically illegal in most municipalities," Howard says. "Even when planners address this issue and recommend rezoning, the next step is to go to the council. Most elected officials won't vote for rezoning for missing middle housing because they want to get re-elected and don't want to confront vocal opposition. NIMBYism is alive and well in most communities."

It's the same story everywhere: Building any missing middle, pocket neighborhood or community of fourplexes is difficult because of zoning regulations, says Jennifer Truman, design principal of [The Rocket Shop](#), a Durham, N.C.-based residential design and land planning firm.

"We've made some progress over the past five years in Raleigh, Durham and Asheville

“People realize that some of the codes are written to keep poor people out of various neighborhoods. If cities don’t address this themselves, the state will do so.”

—Aaron Lubeck, development principal, The Rocket Shop



to make zoning changes in urban infill spaces to allow missing middle and affordable housing to be built,” she says.

The site for VISION House Hickory Grove is zoned for high density, which allows up to 20 units per acre. While Howard could build up to 16 units on the 0.8-acre lot, he faced other regulatory issues that slowed the project and required numerous redesigns.

“Our first site plan had to be sent back to the drawing board after the city of Hickory reviewed it, so that’s when we brought in Rocket Shop to help us,” Howard says. “The city says yes or no, but not why certain things needed to be changed. Jenn Truman knows things really well, such as the fire code, so that helped us find a middle ground.”

The main issues faced by Howard in planning VISION House Hickory Grove were parking mandates, emergency vehicle access, and sanitation rules that require an enclosure for a dumpster rather than roll-out trash bins. While these may seem minor, when you’re trying to include open space and affordable units on a small lot, every inch of space matters, he says.

“We’re literally designing this pocket neighborhood around the dumpster,” Howard says. “Plus, there’s no recycling option with the city-supplied dumpster, so we’re handling all recycling ourselves and taking it to a community site.”

FIXING PAST PREJUDICE

In North Carolina and many other states, zoning regulations establish density standards that eliminate the option for anything other than single-family homes, says Aaron Lubeck, development principal of The Rocket Shop.

“In most of the South, zoning allows for just four to six units of housing per acre, which leads to stealth suburbanization even in cities,” Lubeck says. “A good missing middle density would be 20 to 40 units per acre.”

Lubeck says older zoning codes often reflect the original planners’ prejudices.

“Zoning codes were originally based on race, but in more recent years they’re based on class,” Lubeck says. “People feel those nuances and realize that some of the codes are written to keep poor people out of various neighborhoods.



Coming soon. Still-to-be-finalized floor layouts will integrate sustainable features in multi-level, comfortable attached homes. CREDIT: HOWARD BUILDING SCIENCE

If cities don't address this themselves, the state will do so."

Oregon, Washington and California have led the way to impose state rules that supersede local jurisdictions, Lubeck says.

"They're basically restoring property rights to landowners, homeowners and builders to build what they want and what works in each location," he says. "I think we'll see more of this, and it will radically impact small builders."

COMMON ZONING REFORMS TO ADDRESS

Common sense regulations and a little flexibility could go a long way toward making it easier to develop missing middle or workforce housing, says Alison Adams, community and regional planning director for the Western Piedmont Council of Governments, which helped create a [Housing Growth Toolkit](#) that can function as a blueprint for builders and developers.

"It would be better to let the market and site conditions drive the decision about how

many units of housing can be included on a given site," Adams says. "Instead of a mandate about how many parking spaces are needed or a specific number of allowable units per acre, it would be smarter to have requirements for a certain amount of open space, stormwater criteria and then natural encumbrances like a river nearby drive the number of units that can be built."

For example, a great property with a flat topography could accommodate more units without a zoning exception, she says. Builders want to provide sufficient parking to attract residents and can estimate what's needed based on proximity to transit options and likely resident needs.

Several common zoning issues affect missing middle and workforce housing development, including:

- **Density and setbacks:** Mandatory maximum units per acre and impractical setback rules can be a deterrent to missing middle housing, according to Lubeck. "In Durham, the setback rules accidentally made all corner lots basically

unbuildable," he says. "Even though everyone knew it, it still took 10 years to fix the rules."

- **Lot sizes:** Most locations require a mandatory minimum lot size, typically 5,000 square feet, but in Durham, for example, lots can be as small as 2,000 square feet with three houses, Truman says. "Opening up small lots to development can be especially useful in historic downtown neighborhoods, which they've done really well in Austin and Houston, for example," she says. "You can quickly build two houses where there used to be one."
- **ADUs:** One of the easiest ways to rapidly add housing units to a community is to allow ADUs to be built next to or attached to existing homes.
 - "In Durham, you can build an ADU on any lot with a duplex, which increases housing supply and affordability and lowers the land price per unit," Lubeck says.
- **Duplexes and triplexes:** Allowing

“Cottage communities can still feel like single-family home communities.”

—Jennifer Truman, development principal, The Rocket Shop

duplexes and triplexes on lots that were formally reserved for single-family homes can immediately increase supply, Lubeck says.

“In Durham, you can now put three units on an open lot,” he says.

Minneapolis received a lot of attention for eliminating its single-family zoning, Lubeck says, but it neglected to fix its building code at the same time. The lesson there, he says, is that the city didn’t ask practitioners what was needed and just left it up to the planners.

“They made it almost impossible to build triplexes and fourplexes because they still had to fit in the box of single-family homes,” he says. “Portland, Oregon passed a similar law, and it has all kinds of cottage courts and other missing middle housing because they were more flexible.”

- **Parking:** Mandating two parking spaces per unit is common in many locations and can make it nearly impossible to fit enough units on a site to make it financially viable, especially in infill locations, Truman says.

“North Carolina is likely to be the first state to eliminate parking requirements statewide,” Lubeck says. “The bill has already been partially passed there.”

- **Emergency vehicle access:** While everyone wants residents to be safe, some mandatory rules about large ladder fire truck access impact development. Rules that require a turnaround space can reduce available land for more housing units.

“There are alternatives municipalities can look at, such as buying smaller vehicles in places with single-story or two-story buildings,” Adams says.

Truman says there’s no one-size-fits-all way to create space for emergency vehicles. “What works for turning farmland into the suburbs doesn’t necessarily work for urban infill locations,” she says.

- **Lighting:** Depending on the municipality, a certain number of lights are often required in a new development. Adams suggests builders can make the case that fewer lights may be needed in a dense community with more porch lights and headlights from cars, which could save money.



Little lot, big potential. Housing lots in Durham can be as small as 2,000 square feet with three houses—less than half the size of a typical lot in other cities.

CREDIT: HOWARD BUILDING SCIENCE

Front and center. One of the things VISION House Hickory Grove addresses is “middle housing,” a range of affordable single-family home options that includes duplexes, triplexes, small multifamily buildings or clusters of smaller homes in pocket neighborhoods or cottage communities. CREDIT: COURTESY OF OPTICOS DESIGNS



REGULATORY COSTS CASE STUDY: VISION HOUSE HICKORY GROVE

The first challenge Howard faced at VISION House Hickory Grove was the mandate for two parking spaces per unit, which meant 32 parking spaces were required.

“Our options were to reduce the number of units or go to a multifamily design instead of the duplexes we had planned,” Howard says. “The duplexes didn’t qualify as multifamily. Multifamily zoning reduces the mandatory parking to 1.5 spaces per unit.”

One version of the site plan had a one-car garage underneath each unit, but Howard found that the city didn’t count a garage as a parking space since a lot of people use them for storage.

“An open carport would count, just not a garage,” he says. “We’ve had at least four or five versions of the plans by now and had to pay engineers to re-do those plans.”

Redoing the plans has added extra cost to the project and delays, plus, Howard adds, “it just felt unproductive.”

The current plan has four four-unit buildings configured to look like duplexes. Each building has three stories, with two two-bedroom, 2.5 bathroom units upstairs and two one-bedroom, one-bathroom units downstairs.

The sanitation issue was resolved with an enclosed dumpster, but Howard still hopes for a small variance to reduce the space it requires.

“The Hickory municipality required an enclosed dumpster at Hickory Grove, when the adjacent multifamily community has six uncovered dumpsters in its green space,” Adams says. “I

suggested that maybe Rob can partner with one of the adjacent properties for a shared covered dumpster with a use agreement instead of taking up some of his land.”

A third issue was fire truck access, which requires a large enough radius to turn around a truck unless you have a certain amount of linear driveway space, Howard says.

“We were able to meet the requirement for a fire truck to pull in and pull out,” he says. “Of course you want to provide the safety for all the residents, but we spent a lot of time trying different options for the site to accommodate these rules.”

Howard says every town should have a separate ordinance to meet the needs of pocket neighborhoods or cottage infill sites, since they are smaller and more complicated to design than a subdivision with half-acre lots and single-family homes.

ROLE OF BUILDERS AND DEVELOPERS IN ZONING REFORM

Naturally, builders and developers, particularly smaller businesses, don’t have the time to become activists for zoning reform, but they can have a shared impact, Adams says.

“The biggest impact is to get an ordinance changed at the state level,” she says. “Builders can work with their regional home builder associations and tell the story of how zoning changes could benefit the community, not just their business. It’s better to approach this as a whole city issue rather than just a single parcel.”

However, smaller builders are often left out of

policy discussions that can impact their business, Lubeck says.

“Builder associations tend to be dominated by bigger builders and smaller builders tend to be treated like the ‘red-headed stepchild’ and left on their own,” Lubeck says. “The result is that they often have to compromise on their projects even when they would prefer to build greener, more affordable homes.”

Lubeck recommends builders focus on zoning reform for greater density, since larger minimum lot sizes combined with single-family, home-only zoning naturally leads to larger luxury homes.

“It’s a simple math problem: 10 years ago, a buildable lot was \$30,000 and now it’s \$100,000 to \$150,000 on average,” he says. “You need to lower the cost of land per unit to make building attainable homes financially viable.”

Truman suggests builders focus on design choices that may be more amenable to neighbors and more cost-effective.

“We try to provide good shared outdoor space, semi-private outdoor space and private outdoor space,” Truman says. “Cottage communities can still feel like single-family home communities. It can also be less costly to build 12 cottage units instead of a large apartment building.”

In addition, Truman recommends focusing on needs that are not being met in your market.

“Rob is trying to provide the size of homes that are not available in Hickory,” she says. “He’s including a mix of sizes that work for a family and some smaller units for single people or a couple to provide flexibility within the same site.” **GB**

New Energy, New Optimism in Building Science

When Evan Hutchison played tennis on his high school team, he learned more than how to serve.

“A teammate suggested I take drafting classes since he liked them,” says Hutchison, Howard Building Science’s project manager for VISION House Hickory Grove. “I took three in high school and that led me to consider becoming an architect.”

Hutchison was fortunate to have Rob Howard as a professor and a mentor on the Solar Decathlon team at [Appalachian State University’s Building Sciences program](#) in Boone, N.C.

“I started taking architectural tech and design classes but part of the building sciences program at App State includes sustainable building systems and construction management,” Hutchison says. “The building science program and Rob’s class blend real world applications with the lessons, so it’s not just abstract. Rob pushed me to take the construction management track as a second major, which was great because I had to learn business law, accounting and public speaking.”

Hutchison flourished at App State and co-founded the American Institute of Architecture Students-U.S. Green Building Council chapter at the school.

“The building science program pounds green aspects and sustainability into every class and explains how the decisions builders make today will impact the earth 100 years from now,” Hutchison says. “Architecture and building



Championship caliber. Evan Hutchison, Howard Building Science’s project manager for VISION House Hickory Grove (center, holding trophy), was part of Appalachian State’s award-winning retrofit housing team at the 2023 Solar Decathlon Design Challenge.

CREDIT: COURTESY OF APPALACHIAN STATE UNIVERSITY

science offer a great blend of creative and analytical thinking.”

Hutchison recommends App State and building science in general as an antidote to concerns about AI taking over some professions.

“There is a lot of opportunity to grow in this field and a huge need for more sustainable

buildings, too,” he says. “Plus, it’s fun—lots of interesting professors and everyone is required to do an internship.”

While some students have a construction background, Hutchison’s internship was the first time he was on a job site. He discovered that’s exactly where he wants to be.

RESOURCES FOR WORKFORCE HOUSING AND ZONING REFORM

- **Incremental Development Alliance**
<https://www.incrementaldevelopment.org/> provides training and other resources for small developers, architects and builders
- **Missing Middle Housing**
<https://missingmiddlehousing.com/> provides information about the issues related to missing middle housing, architectural plans and other resources
- **Parking Reform Network**
<https://parkingreform.org/> offers policy ideas for sustainability and affordable housing
- **Pocket Neighborhood Hub**
<https://rosschapin.com/pocket-neighborhoods-hub/> Architect Ross Chapin provides resources for the development of small scale developments including zoning codes
- **Western Piedmont Housing Growth Toolkit**
https://www.wpcog.org/_files/ugd/960958_950ebboba7af4636bof6aa6cdefeefcfb.pdf
- **Western Piedmont Housing Growth Roadmap with Case Studies**
<https://experience.arcgis.com/experience/fe15376bc95e4a9aa1460d554f1b6579/page/Home>
- **YIMBY Action Organization**
<https://yimbyaction.org/> advocates for more housing development, including zoning reform

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ALL PHOTOS COURTESY OF JEFFREY TOTARO

Passively Perfect

Modern building strategies help create an exceptional living environment and meaningful, measurable sustainability.

EDITOR'S NOTE: Our January/February 2026 issue features our annual Green Home of the Year competition, with profiles of the winning construction projects. Here's an example of the types of homes we'll be judging, featuring a runner-up from last year's event.

BY RICHARD PEDRANTI

The Niantic Net Zero House is a single-family home neat in the sailing mecca of Block Island Sound in Connecticut. Passive House design strategies create an exceptional living environment for this home, which is embraced in granite cliffs with breathtaking views of Niantic Bay.

For a Philadelphia couple, finding a location for their second home and choosing an architect to fulfill their vision was a years-long journey.

The husband, a renowned designer and builder of luxury catamarans, and his wife, a prominent communications executive, thoroughly investigated communities, natural environments, and properties that would enable the indoor/outdoor lifestyle they desired. This included convenient access to their own catamaran and a robust sailing community they would enjoy into retirement.

After years of searching along the Eastern



Project Stats

NAME: Niantic Net Zero

BUILDER: Bluewater Millwork & Construction

ARCHITECT: Richard Pedranti Architect RPA

INTERIOR DESIGNER: OLC Furniture and Lighting

LANDSCAPE ARCHITECT: Indigo Land Design

PHOTOGRAPHER: Jeffrey Totaro

From the Judges

"Luxury with some energy efficiency."



Nothing but net (zero). The Niantic Net Zero home will include onsite renewable roof mounted solar panels, which will help it achieve net zero status.



A way with windows. Glass walls with external shades across the eastern side of the home provide an effective strategy to regulate sun exposure and control passive solar gain.



LIGHT IT UP.
LED lights help keep energy costs to a minimum.

POWER SAVERS.
Appliances throughout the house are ENERGY STAR certified.

GLASS IN MOTION.
The home includes triple-pane inswing tilt/turn windows, which offer superior environmental control.

Seaboard, they discovered an undeveloped cliffside site facing Niantic Bay, adjacent to a vibrant sailing community. This location also encouraged the incorporation of a living space that would entice their adult son to visit regularly from New York City.

Passionate and knowledgeable about thoughtful design, the couple sought modern building strategies to deliver an exceptional living environment, beautiful aesthetics, and meaningful, measurable sustainability. After painstaking research into architects at the vanguard of sustainable modern design, a detailed design brief went to Milford, Pennsylvania-based Richard Pedranti Architect (RPA) on a Sunday. Enthused by the details, the two entities were on the phone that afternoon. The firm soon visited the site to document the project location's assets.

DONE BY DESIGN

The selected contractor, Bluewater Millwork & Construction in Essex, Connecticut, was headquartered just 30 minutes from the site and was distinguished by building the first Passive House in the state of Connecticut. An avid sailor himself, the principal grew up in the area to become a respected builder, working with local subcontractors, all continuing the proud tradition of New England craftsmanship.

The small waterside community now enjoys an exquisite modern home nestled naturally into the cliffside and glowing warmly above the New England marina, which is also home to the couple's own catamaran—a new addition to the area's distinguished sailing tradition. More importantly, the Passive House strategies combined with photovoltaic solar collection make this home an energy-neutral inspiration to the community and those who consider how

to conceive their own home design.

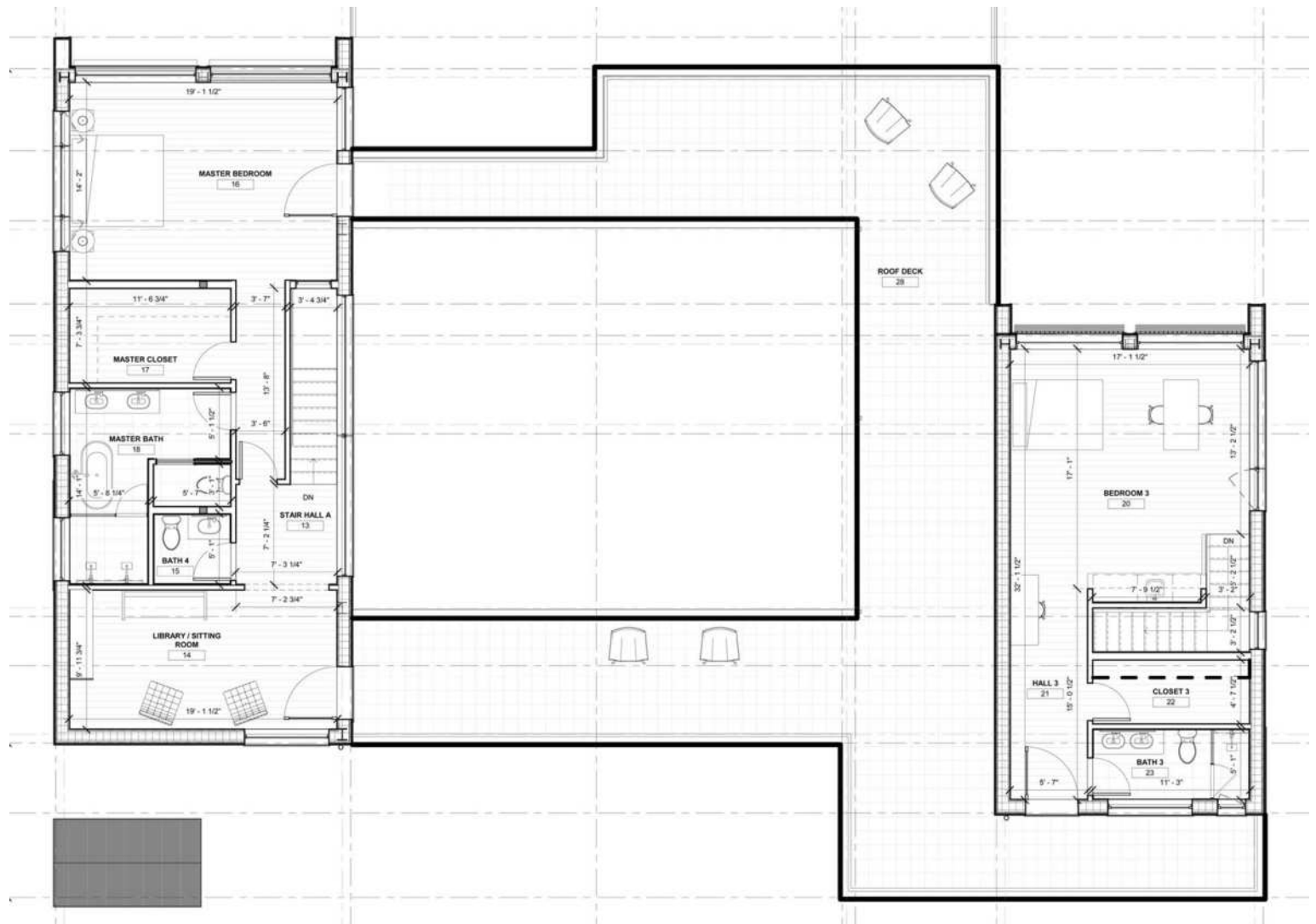
This project is intended to serve as a second home for the owners of a luxury catamaran design/build firm. They searched for years to find a modern home that was one with its natural environment while enjoying access to and expansive views of the water, and which could support their vision of a modern home.

Discerning of design details and materials selection, these considerations were paramount—as was the goal of sustainability. The clients expect to employ leading-edge building design and construction strategies to minimize the environmental impact of their new home. Aesthetically, the clients envisioned the design would integrate “two barn shapes.”

PROGRAM REQUIREMENTS

Given the long search to find the perfect property, the client challenged the team to

FLOOR PLAN



COURTESY OF RICHARD PEDRANTI ARCHITECT

complete the project in 18 months. That challenge included meeting several design requirements.

- Maximize the impact of the views of Niantic Bay from indoor and outdoor areas.
- Create a separate living space for visits from the adult son of the owners.
- Mitigate design and construction challenges created by the site's granite cliffside.
- Engineer to meet stringent approval requirements of the area, particularly for stormwater management.
- Work through the New England winter to meet occupancy deadline.
- Leverage modern building strategies for a maximally sustainable home.

DISTINGUISHING ASPECTS

Passive House design strategies, combined with onsite renewable roof mounted solar

panels, help achieve the clients' sustainability objectives and the home's net zero status. A prefabricated envelope and steel framing help meet the client's aggressive schedule.

As one of the most experienced U.S. architecture firms in prefabricated Passive Houses, RPA advised on general contractor and prefabricated vendor selection.

Glass walls across the eastern side of the home ensure continual views of the bay, retracting to connect seamlessly to the outdoor space. External shades provide an effective strategy to regulate sun exposure and control passive solar gain.

RPA envisioned the two barn shapes into zoning which defines the master zone and a separated guest zone connected by a public zone for gathering. The middle zone also serves to connect the home with the natural flow of granite cliff above, and the waters of Niantic Bay below. **GB**

"The Passive House strategies combined with photovoltaic solar collection make this home an energy-neutral inspiration to the community and those who consider how to conceive their own home design."

Richard Pedranti is founder and principal of Richard Pedranti Architect (RPA), a premier architecture firm pioneering energy-efficient architecture for modern living.



Tall order. Completed in 2022, The Ascent, a 25-floor, 284-foot-high structure with 259 apartments, is the world's tallest wooden tower and is made with sustainably sourced timber.

CREDIT: COURTESY OF KORB ARCHITECTURE

ON THE ASCENT

For Milwaukee's world record-setting wooden high rise, **'Sky's the Limit'** means more than its height.

BY ALAN NADITZ

When someone thinks “skyscraper,” they envision a multi-story building with gleaming windows and steel frames. But wood? That’s so 19th century.

Except now, it’s not. Technological advancements in engineered wood—“mass timber”—are making it possible to construct high rises entirely or at least partially from wood.

Just ask the developers and builders of [The Ascent](#) in Milwaukee, who in 2018 had a modest goal of building a 19-story, multi-family luxury apartment building made of mass timber. By 2022, they were celebrating the opening of a 25-floor, 284-foot-high structure that was officially the world’s tallest wooden tower.

At that time, Tim Gokhman, CEO of project co-developer [New Land Enterprises](#), said his firm didn’t set out to break records. “We just wanted to create the best experience within the built environment for our residents,” he noted. “Mass timber is faster, more precise, lighter, more beautiful, and supports our commitment to biophilic design.”

Ascent’s first six floors are allocated to retail space and a parking garage, while the remaining 19 floors, all of which are solid wood construction, are dedicated to 259 luxury apartment units. The entire project cost about \$130 million, which is on par with traditional steel-concrete structures. Actual construction took 22 months—about 25 percent faster than expected with a non-wood alternative, according to research from the [Council on Tall Buildings and Urban Habitat](#) (CTBUH).

Mass timber is also quite a bit more environmentally friendly: Wood absorbs carbon dioxide (CO₂) emissions, and Ascent sequesters more than 7,200 metric tons—the equivalent of taking 2,400 cars off the road for a year, or as much CO₂ as would be emitted by heating 1,200 homes for one

year, CTBUH notes.

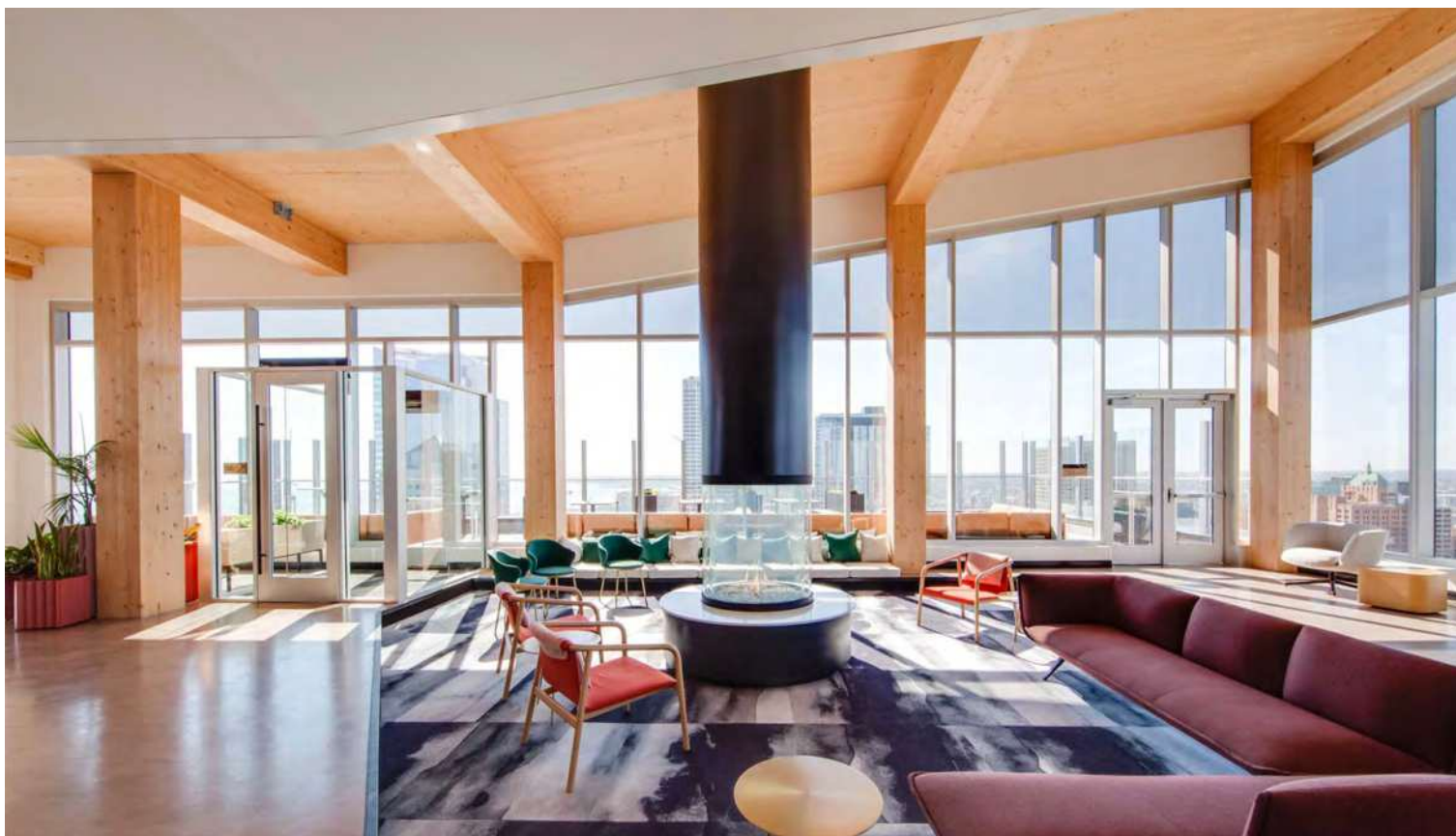
WHICH WAY TO GO WOOD?

New Land Enterprises and the other project participants—co-developer Wiechmann Enterprises, architecture firm [Korb Architecture](#), structural engineer [Thornton Tomasetti](#), timber sourcing provider [Timberlab](#), and general contractors [Catalyst Construction](#) and [C.D. Smith](#)—had several ways to implement creation of The Ascent. There are four combinations of structural material (see the sidebar, “What’s the Difference?”), and five primary mass timber products:

- **Cross-laminated timber (CLT):** Layers of lumber stacked at 90-degree angles and bonded with adhesive.
- **Glue-laminated timber (glulam):** Parallel layers of lumber bonded with adhesive.
- **Dowel-laminated timber (DLT):** Softwood lumber boards joined by hardwood dowels.
- **Nail-laminated timber (NLT):** Dimensional lumber stacked on edge and fastened with nails or screws.
- **Dowel laminated timber (DLT):** Similar to NLT, this product uses wooden dowels instead of nails or screws.

Developers opted for a mass timber superstructure consisting of exposed glulam columns and beams supporting CLT floor panels. The CLT material came from sustainably managed rapid-growth European white spruce forests in Austria, which are cultivated specifically for forestation. The volume of timber used in construction regrows within 25 minutes throughout North American forests, according to Korb Architecture.

Meanwhile, glulam makes the building more fire resistant. Burn tests



Feeling happy. Rooms with exposed wood beams and ceilings provide a psyche-friendly environment for occupants. CREDIT: COURTESY OF KORB ARCHITECTURE



Log longevity. The volume of timber used in construction regrows in about 25 minutes within sustainably managed forests. CREDIT: COURTESY OF SEAGATE MASS TIMBER



The fire inside. A three-hour burn test revealed that mass timber's outer structure can slowly incinerate, but the interior remains undamaged. CREDIT: COURTESY OF KORB ARCHITECTURE

conducted by the USDA Forest Service's Wood Innovations Grants Program and Forest Products Laboratory determined that oversized yet unprotected glulam columns do not lose structural integrity during a three-hour burn because there is only outer layer charring—the internal layers remain protected. Also, charring stops on its own after the heat source is discontinued. As a result, the columns easily qualified for Milwaukee's mandatory three-hour fire resistance burn rating.

BENEFITS OF MASS TIMBER—INSIDE AND OUT

There are design benefits in Ascent that New Land Enterprises happily implemented. For example, the building includes efficient and space-saving hydronic radiant heating systems, which pump heated water from a boiler into tubing that is embedded into flooring. These systems don't dry out the air, which means there is no ductwork required.

The cooling system consists of an energy-efficient variable refrigerant flow (VRF) system, as well as the latest water filtration techniques. The current stormwater management system slows the flow into the combined sewer, helping reduce the burden on the city's infrastructure during a major storm event.

Meanwhile, the interior features exposed wood beams and ceilings in all living rooms and bedrooms, while sunlight filters through floor-to-ceiling windows, and ventilation draws in fresh air from Milwaukee's lake breezes. All of these provide a more natural environment that, according to Gokhman, enhances people's physical and emotional well-being. "It's not just aesthetics," Gokhman noted in a report by Development Magazine. "It's the feeling you get from being in a building that has texture, warmth and natural elements. You feel better in it."

Also feeling better with mass timber: Contractors, in terms of their bottom line. From an environmental standpoint, the production process for steel and concrete requires heating materials to very high temperatures, which generates most of their carbon emissions. The process is also fossil fuel dependent. Production of construction timber, in contrast, is at least partially powered by biomass or sawmill residue.

Because CLT panels are custom made away from the construction site and are transported readymade, there is up to 90 percent less traffic during construction. Approximately 75 percent fewer workers are needed, and it's up to 40 percent faster to build with timber than with traditional materials. These benefits help offset the higher cost of CLT panels, which are typically



Cleaning agent. A wooden tower can absorb more than 7,200 metric tons of carbon dioxide; the equivalent of taking 2,400 cars off the road for a year, or as much CO₂ as would be emitted by heating 1,200 homes for one year. CREDIT: COURTESY OF KORB ARCHITECTURE

15 percent to 20 percent more, according to a report by KONSTRUKCE Media.

With regard to load bearing, timber walls are significantly thinner than concrete but still capable of handling the same weight. Ascent's panels are 60 millimeters thick and are about five times lighter than traditional materials. This made it far easier to build the base of the tower, KONSTRUKCE Media notes. There's also a lack of setting time versus that required with concrete construction, meaning that finishes can be added much sooner.

Korb Architecture founder Jason Korb calls the tower a proof of concept for developers who want to create innovative structures from timber. "We believe in the power of architecture as an engine for positive change," said Korb to KONSTRUKCE Media. "Ascent could become an example for future high-rise wood buildings on a national scale in how it combines its environmental friendliness with modern and high-quality architecture."

UPCOMING MARKET INFLUENCES

Mass timber high-rises have grown in popularity in the U.S. over the past decade. Projections show the number of such structures increasing from 2,000 in 2023 to more than 24,000 by 2034, according to McLean, Virginia-based tech industry policy coalition [Chamber of Progress](#). That growth rate could

be impacted for better or worse by rising lumber prices, regulatory hurdles, tariffs, interest rates, and a shaky economy.

Thus far, it hasn't happened. Lumber prices have bounced up and down throughout 2025, with current figures as of November 1 down about 23 percent from the year's high at the beginning of August, according to world economics forecaster [Trading Economics](#). But overall, prices are up about 12 percent from October 2024, according to the [National Association of Home Builders](#) (NAHB).

Current prices may be down because some builders overprepared for proposed tariffs against Canada, which exports about 60 percent of its lumber to the U.S. "Everyone's overstocked, so there's no demand," says wood market analyst Russ Taylor. "It's going to take months before all of this unwinds."

But housing starts have increased, which, combined with lowering interest rates, could boost lumber prices again, Taylor adds.

The mass timber market, meanwhile, is expected to grow by about 4.5 percent from 2025 to 2030, reaching \$1.3 billion, according to market research group [Research and Markets](#). The market growth, it notes, "is driven by a combination of climate policy alignment, urban housing needs, supply chain modernization, and investor interest in green building innovation." **GB**

WHAT'S THE DIFFERENCE?

Not all mass timber projects are the same. There are four types of wood-based structures that are considered to be “mass timber.”

- **All-timber structures.** To qualify as an “all-timber” structure, both the main vertical and lateral structural elements must be constructed from timber. An “all timber” structure may include the use of localized non-timber connections between timber elements. A building of timber construction with a floor system of concrete planks, or concrete slab on top of timber beams, is still considered a “timber” structure, as the concrete elements are not acting as the primary structure.
- **Concrete-timber hybrid structures.** In these buildings, a significant element of the vertical or lateral load-bearing system is made of concrete, often presented as a concrete core supporting a timber frame. Other commonly seen examples include buildings that use lateral spanning elements, such as beams, and vertical load bearing columns made of concrete, with timber serving as the main floor decking system. Several of the factory-prefabricated systems on the market integrate concrete frames with timber inlay panels for walls or flooring, or timber-framed modules with pre-poured concrete flooring.
- **Steel-timber hybrid structures.** In these projects, a significant element of the vertical or lateral load-bearing system is made of steel. Most typically, this will be a lateral force-resisting system such as steel-framed cores, buckling-restrained braces, perimeter-frame or exoskeleton steel bracing systems and a gravity system composed of columns and beams that interact with a timber floor or wall system. Generally, this structural classification is meant to reflect a substantial use of steel, beyond the fasteners and connectors used in typical mass timber and wood-frame construction.
- **Concrete-steel-timber hybrid structures.** These buildings use a combination of all three materials to carry primary loads. The most typical combination would be a concrete core working in tandem with steel beams and columns, with timber flooring and partition walls, but many variations exist.

SOURCE: COUNCIL ON TALL BUILDINGS AND URBAN HABITAT (CTBUH)

THE FAB FIVE

The world's five-largest mass timber buildings have their own identities within the wood tower design spectrum:

- 1. The Ascent, Milwaukee, Wisconsin:** As noted, this concrete-timber hybrid structure is the tallest all-residential tower—for now.
- 2. Mjøstårnet, Brumunddal, Norway:** Although it was knocked off its No. 1 perch by The Ascent in 2022, Mjøstårnet—all 280 feet and 18 stories of it—is still the world's tallest all-wood timber structure.
- 3. HoHo Wein, Vienna, Austria:** At 24 stories and 275 feet, this is the largest mixed-use (hotel and office space) concrete-timber hybrid structure.
- 4. HAUT, Amsterdam, Netherlands:** Twenty-two stories, 239 feet and 55 apartments—good for the title of tallest all-residential concrete-timber hybrid in the Netherlands.
- 5. Sara Kulturhus, Skellefteå, Sweden:** The world's current tallest (238 feet, 19 floors), mixed-use, steel-timber hybrid building.



CREDIT: COURTESY OF MOELVEN

MJØSTÅRNET



CREDIT: COURTESY OF CEFIS BAUENTWICKLUNG • KITO.AT

HO-HO WEIN

A construction primer. Affordability efforts during design of the Elizabeth River Project's Ryan Resilience Lab in Norfolk, Virginia, included careful consideration of building code requirements, comparative roof structures, and the type of sustainability technology employed.



ALL IMAGES ARE COURTESY OF ARCHITECTURAL DESIGN PHOTOGRAPHER YUZHU ZENG

Affordable to the Extreme

Here are **seven ways** to build for climate resilience without breaking the bank.

BY SAM BOWLING

The threats posed by climate change, extreme weather events and environmental degradation are growing, and for vulnerable coastal and flood-prone areas, there is no choice but to adapt. Whether you're constructing something new or renovating an existing structure, incorporating sustainable and flood-resistant designs helps buildings withstand future challenges.

The long-term benefits of sustainable and flood-resilient buildings—such as reduced energy costs, and lower maintenance and repair expenses—often outweigh initial expenses. However, the upfront investment represents a significant barrier for many developers and property owners, who are discouraged by the higher prices. This is one reason the Norfolk, Virginia nonprofit Elizabeth River Project developed the Ryan Resilience Lab, a sustainable building designed to showcase **cost-effective materials and solutions for builders and homeowners facing the challenges of floodwaters and climate adaptation.**

As the lab demonstrates, builders and homeowners who embrace creative thinking and off-the-shelf solutions can achieve the desired result without spending a fortune. Here are seven tips for doing just that, drawn from my experience designing the lab.



NATURAL LIGHT

Positioning a building to maximize natural light is a great example of a low-cost decision that pays off big in energy savings. For the Ryan Resilience Lab, we strategically oriented the building to take advantage of ample, glare-free northern light while shading south-facing windows to limit hot summer sun. This not only cuts down on the need for artificial lighting but also makes the space more pleasant and productive for everyone inside.

We also chose to include operable windows, which are rare in projects where developers usually prefer to keep everything hermetically sealed. But with this being a small building used by a single, close-knit team, we talked with the clients and agreed they could manage temperature and humidity, reducing the reliance on air conditioning. This approach lets us skip the need for pricey control systems. It also provides a degree of interior climate control during power outages that may be caused by severe weather events.



Easier on the eyes. An emphasis on natural light cuts down on the need for artificial light and makes the indoors more pleasant and productive for occupants.



CHOOSE A HEATING AND COOLING SYSTEM THAT MAKES SENSE

Geothermal heating and cooling is a preferred system for builders looking to ensure the highest degree of sustainability, but it comes at a cost. In addition to the dollar amount (which can extend into tens of thousands of dollars), these systems require enough land for a wellfield that can ensure sufficient conductivity in the subgrade. This includes conductivity tests and installing specialized units inside the building that operate under very high pressure.

For the Ryan Resilience Lab, we chose a multi-zone heat pump that operates at a commercial-residential scale, at a cost 20-30 percent less than that of a more complex commercial system. We did opt for a model with a higher efficiency rating, which does come at a slightly higher cost for homeowners due to specialized components such as higher-efficiency valves and fan units.

This is a marginal cost increase that I believe is worth making. Also, instead of drilling 100 geothermal wells, we simply mounted the mass-produced units on the rooftop of the building.



Top notch. Instead of more expensive geothermal wells, Work Program Architects opted for multi-zone heat pumps with higher-efficiency valves and fan units mounted to the roof.

3 GO WITH AN EFFICIENT, COMMON-SENSE WATER SYSTEM

Many sustainable buildings have the capability to recycle 100 percent of the water they collect, including runoff from gutters, and filter it for reuse as potable water through reverse osmosis technology. This is extremely expensive and requires special exceptions to the plumbing code. Our goal at the Ryan Resilience Lab was to recycle rainwater, but we opted for a greywater system instead. This involves filtering rainwater to remove impurities and organic matter to make it available for non-potable uses, such as flushing toilets.

Our decision to capture rainwater for such purposes was driven by practicality and sustainability, given the frequent rainfall in our area and the anticipated high number of hosted events in the building, which serves as a community gathering space. Treating that water to meet minimum safety standards incurred some costs, but it is significantly lower than the expense of making it drinkable. By adopting this approach, we reduce water bills and the amount of pollution that enters the river system.

4 DESIGN TO LET WATER PASS WITHOUT PAYING A PREMIUM

At the Lab, we set the first occupied floor above the floodplain and treated the ground level as a deliberately floodable, semi-outdoor zone. The design team often joked it was “built like a beach house,” but the strategy was serious: raise the living areas out of harm’s way and allow water to move freely through the ground level. Instead of fragile breakaway walls, we used flood damage-resistant materials such as concrete block, corrosion-resistant metals, and pressure-treated wood. We went a step

further by specifying a preservative treatment that reduced the risk of toxic leaching during tidal flooding—a small but important choice when building on the edge of the Elizabeth River.

We also avoided a costly mistake. Early in planning, we considered under-building parking, but code would have required nearly the entire ground floor and first structural level to be concrete, which is massively expensive. By moving parking outside the footprint, we were able to frame the building in wood, saving on costs while still meeting code. This decision gave us a taller, slimmer building that freed up more of the site for stormwater absorption. In short, planning for floods forced us to make smarter choices—and those choices paid off in resilience and affordability.



Stormwater smart. The Ryan Resilience Lab’s living areas are above the floodplain, while a floodable ground level allows water to efficiently flow below.

5 UTILIZE OFF-THE-SHELF PRODUCTS FOR FLOOD-PROOFING

Because flooding impacts different kinds of spaces in different ways, we made sure to utilize affordable, off-the-shelf solutions appropriate for each space. The incursion of water into the elevator lobby, for instance, could lead to major systems and materials damage. We took a “dry floodproofing” approach to that limited space. Deployable aluminum flood logs stack into side brackets in the external doorway and seal tight against floodwaters. They’re rated to withstand about four feet of water pressure and are common retrofit products, which made them a cost-conscious choice that any homeowner could use.

By contrast, the stair tower was “wet floodproofed” with smart vents—pressure-activated openings that only release under standing water load. Installed on opposite sides of the structure, the vents equalize hydrostatic pressure and prevent walls from buckling. (Without those balanced openings, a single-sided vent could actually worsen damage by letting waves or water pressure push unevenly against a wall.)

Equally important was moving sensitive equipment out of the danger zone. At the lab, electrical panels, solar switchgear and HVAC units were elevated four feet above grade, safely above the design flood elevation. This was partly about

about code compliance, but also about common sense: replacing submerged mechanicals is far more costly than designing them out of harm's way in the first place. This means Elizabeth River Project staff can keep the lights on and operations running even during a flood event. For homeowners, the same principle applies: Raising utilities onto a simple platform can mean the difference between quick recovery and thousands in replacement costs.



Flood guard. A stair tower that is “wet floodproofed” with smart vents—pressure-activated openings that only release under standing water load—equalize hydrostatic pressure and prevent walls from buckling.



USE SIMPLE GREEN INFRASTRUCTURE TO MANAGE STORM-WATER

The lab's site is designed as a patchwork of green infrastructure—rain gardens, bioswales, vegetated areas, and pervious paving—that soak up stormwater rather than funneling it into already-overloaded municipal drains. Norfolk's aging stormwater system often backs up during heavy rain, leading to “nuisance flooding” that can overwhelm streets and doorways. By capturing and infiltrating water on site, we reduced flood risk and pollution running into the Elizabeth River.

Importantly, these systems don't need to be complicated or costly. One of the

rain gardens at the lab is essentially a sunken planter bed filled with salt-tolerant marsh grasses. It's not a highly engineered basin with underdrains and overflows, but it still does the job: absorbing stormwater, filtering pollutants, and thriving even when submerged. For homeowners, this approach is highly replicable. A simple, strategically placed rain garden or pervious path can make a property more flood-resilient without requiring specialized infrastructure.



Cooperative effort. The lab's site is a patchwork of rain gardens, bioswales, vegetated areas and pervious paving, which soak up stormwater rather than funneling it into overloaded municipal drains.



CHOOSE RETROFIT-FRIENDLY GREEN ROOF SYSTEMS

Green roofs often carry a reputation for high cost and heavy structural demands, but there are affordable, accessible options that deliver many of the same benefits. At the lab, we installed a shallow, tray-based green roof with only four inches of planting medium. Unlike deeper, intensive systems, this retrofit-friendly product doesn't require extensive reinforcement of the roof structure. In fact, it's marketed specifically for existing buildings, making it a strong option for anyone looking to improve resilience without major renovation.

This modest system still pays dividends: It extends the lifespan of the roof membrane, provides a bit of insulation, and reduces runoff by absorbing rainfall before it ever hits the drains. Builders and homeowners don't have to choose between “all or nothing” when it comes to resilience features. Even a lightweight, modular green roof can make a measurable difference, at a cost that is far lower than most people assume. **GB**

Sam Bowling is an architect and associate principal at Norfolk, Virginia-based [Work Program Architects](#) (WPA). He leads the firm's office in Raleigh, North Carolina.



A burning question. Another disastrous year of wildfires has the construction industry looking for a more-resilient way to build homes that can survive the destruction. CREDIT: ISTOCK/ICO_K-PAX

A Sense of Urgency

The wildfire crisis has prompted engineers and builders to explore residential concrete construction as a viable alternative to wood.

BY GREG RANKIN

Due to devastating wildfires, residential construction in California has reached a tipping point. The Los Angeles-area wildfires earlier this year—a mere 14 that burned 57,500 acres and resulted in more than \$62 billion in damage—underscore the critical need to reconsider how homes in fire-prone areas are constructed.

This is not an isolated incident. According to the Environmental Protection Agency, as of mid-October 2025, there have been 54,615 wildfires in the United States, burning approximately 4.7 million acres. In California specifically, the numbers are 7,519 wildfires and 522,306 acres burned for the year to date. That means the Golden State accounts for nearly 1 in 8 fires and more than

11 percent of acreage burned nationwide.

It's also no fluke. In 2024, California experienced 8,024 wildfires, scorching almost 1.1 million acres, according to Cal Fire. The nation saw nearly 65,000 wildfires for a total of 8.9 million acres burned, according to the National Centers for Environmental Information.

A ROCK-SOLID APPROACH

Engineers have long advocated for an increased use of fire-resistant materials in residential construction, but the higher costs when compared to wood have slowed widespread adoption. But various innovations are dramatically lowering the cost of utilizing concrete in residential construction. Adding fireproof doors, windows and a metal roof can transform homes into fire-resistant structures.

These advancements in residential concrete construction extend beyond fire defense. Concrete has long been viewed as a greener option because it lasts two to three times longer than a wood-framed home, and they are not vulnerable to external factors such as insects, moisture, mold or wind, all of which can result in structural damage and safety risks.

"Concrete is, by its nature, a very durable and resilient material regardless of the hazard," explains Evan Reis, a 30-year structural engineer and executive director of the [U.S. Resiliency Council](https://www.usresiliencycouncil.org/), a California-based nonprofit that advocates for well-engineered structures built with resilient materials. "From the performance side of things, concrete homes make a ton of sense."



Digging in. A concrete home's footprint—the type of foundational system that interfaces with the ground—affects the home's cost, energy efficiency and durability.

CREDIT: COURTESY OF NONQUIT HOMES

With more people moving to hazard-prone areas and an increase in natural disaster-related losses, Reis stresses that “something has got to change.”

BUILDING A FOUNDATION

Constructing homes out of concrete has long been viewed as a superior option if costs could be brought in line with wood-framed designs. New building methods are promising to do just that. In fact, when lifetime upkeep, insurance, and other expenses are factored in, concrete homes are expected to greatly reduce the total cost of ownership.

The latest advances piggyback on the tilt-up designs common in commercial construction. For residential construction, the cost savings materialize with the use of small, prestressed sandwich panels, which don't require expensive cranes. Instead, the panels can be maneuvered by forklift—which also cuts down on labor costs.

“An entire house can now go up with just 3 or 4 people onsite to tilt up the panels and set them in place,” says Alonso Forcado, an engineer from

Palacios, Texas-based **Nonquit Homes**, which helped design and build the first residential home outside of Atlanta using this style of construction.

The panels can also be poured onsite, which eliminates the need to transport heavy panels from a precast manufacturer, where every mile increases their cost, Forcado notes.

SHORTER TIME, BETTER EFFICIENCY

The construction time associated with **building concrete homes** can be greatly reduced when compared to traditional wood-framed designs. For example, depending on the size, a wood-framed home can take 6 to 12-plus months to complete. But once a builder can properly train a crew on the new concrete building process, construction times can be reduced to as little as 120 days, depending on the size of the residence.

Energy efficiency is another area of construction concern that is being addressed by the prestressed tilt-up concrete panel home design. While concrete is very dense and therefore airtight, it is not considered a

good insulator. However, by incorporating a thick layer of insulation inside the concrete panels, the home's energy efficiency can exceed that of a traditional wood-framed house.

In fact, insulated panel concrete homes have the potential to reduce energy costs by as much as 60 percent, experts note.

RESILIENCE RETRAINING

One of the biggest obstacles to seeing a transition from wood to concrete in residential construction comes down to the know-how. “Right now, there are simply not enough contractors that know how to efficiently build a home out of concrete,” Reis says.

To help speed development into residential concrete construction, companies such as Nonquit Homes have begun offering a program featuring educational courses for contractors. The program takes 8 days and includes hands-on training that will provide builders and skilled workers with the knowledge and ability to pour and erect prestressed concrete panels for quick and cost-effective home building.



New directions. Once confined to commercial construction, tilt-up, pre-stressed concrete panels are now being used in conjunction with poured-in-place concrete to deliver a cost-effective approach to building more-durable homes.

CREDIT: COURTESY OF NONQUIT HOMES



All for one. With its concrete home constructions, Nonquit Homes takes a monolithic approach, installing the concrete slab and foundation footings together for a faster-built and easily reinforced structure.

CREDIT: COURTESY OF NONQUIT HOMES



Joining forces. A combination of steel and concrete components creates a highly weather resilient, decay resistant, non-combustible home.

CREDIT: COURTESY OF NONQUIT HOMES

“Sustainable design has always been translated into green design, or having a low impact on the environment,” concludes Reis. “That is only half of the equation. The other part is the environment having a low impact on us. By combining green design with resilient design, we can achieve sustainability.” GB

Greg Rankin is a Houston-based freelance writer with more than 20 years of experience writing about construction, concrete, and green building solutions.

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By the time most people read this column, the forest road that provides our wheeled access to Mariposa Meadows will probably be closed for the winter. The closure date is always uncertain, determined by the onset of snow that will blanket the high country for several months. Some years, the shutdown comes as early as Halloween, but in others it may take place closer to Christmas. It just depends.

As most of you who are familiar with Green Builder already know, we are completely off-grid here and at an elevation of more than 10,000 feet. The winter weather is not to be taken lightly. All of this makes for some difficult choices.

We would like to be able to enjoy the facilities here year-round. The solitude in winter is truly magical. The skies are deep blue, the forests are in repose and the meadows are a vast landscape of pristine white. The sun can be brilliant, but the daylight hours are short, so the solar power generated, even by a 12-kilowatt system, has its limits. The same is true for the passive solar gain that we so carefully oriented to maximize.

High-efficiency, tankless combination boilers provide the radiant space heat, domestic hot water and the cooking fuel for each of the buildings. They are liquid propane fired. We wrestled with attempting to go all-electric. But at the time we specified the mechanical systems and appliances, even the most energy efficient options available would have required a gigantic photovoltaic (PV) system—much larger than practical for a set of three buildings.

It's worth noting, however, that those boilers and appliances are not operational without normal house current. No power, no heat. At the same time, the battery system, which is routinely recharged by the PVs, relies on a propane powered generator for backup. So, without enough fuel to last through the entire season, there is no other source of power when there's not enough sunlight. They are mutually dependent and mutually vulnerable.

Additionally, our satellite Wi-Fi connection, which enables us to

remotely monitor and manage the operation, is only functional when connected to live house current. No electricity, no internet.

Therein lies the quandary. We must winterize the compound, which we have done before, or roll the dice and attempt to keep this fairly complex arrangement functioning from afar through many weeks of risky conditions. It could only take a few consecutive nights of the low temperatures here to cause a tremendous amount of damage.

Assuming the main highway is passable, we should be able to respond and gain access via snowmobile, snowshoes or cross-country skis. Even then, there are no guarantees that we would successfully troubleshoot potential problems and restore all components to working order. Our decision will ultimately come down to how much confidence we have in the reliability of our systems and our ability to deal with possible adversity.

Still, when I pause to consider our situation, I am heartened by the fact that at least we have control of the response that might be needed, unlike the millions of Americans who are grid-tied and simply hopeful that the energy they need to heat their homes, preserve their food supply and provide comfort and security for their families will be delivered when it is needed the most.

Even though whole-house battery backup systems are gaining ground in the industry and market, I can't resist pointing out that emergency generator sales skyrocket after crises have already occurred, but seem to otherwise represent a much lower priority than, say, home theaters and hot tubs the rest of the time. I suppose you make your choices and you take your chances.

At the end of the day, I reckon it is all a matter of perspective. Consider those souls on the International Space Station, whose very lives depend on a set of technologies and systems that are far more complex than what we're talking about here. Plus, their odds of encountering a catastrophic collision with some random piece of space junk, or maybe the odd asteroid, must be a lot greater than ours. **GB**

VISION HOUSE HICKORY GROVE

Green Builder Media's latest VISION House project is a 16-unit multifamily, prefab, net zero workforce housing project.



HICKORY GROVE

With a **build-to-rent model** and a focus on livability, the VISION House Hickory Grove blends affordability with forward-thinking design. Each home in this community is built for performance and resilience. Using volumetric modular construction, the project reduces waste, controls costs, and shortens build time. High-efficiency systems, solar energy, battery storage, airtight envelopes, and healthy ventilation ensure comfort, durability, and low utility costs. Smart home technology and climate-ready design round out the vision for future-proof housing.

Follow the VISION House Hickory Grove's progress at:

<https://www.greenbuildermedia.com/vision-house-hickory-grove>

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