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July/August 2025 / www.greenbuildermedia.com



THE GREAT DISRUPTION

For this year's Eco-Leaders, we look at builders who are stepping out boldly with advanced technologies and strategies. They're changing how the game is played, and beating market expectations.



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CLOSING THE PLASTIC WASTE LOOP THROUGH FLOORING INNOVATION

One of the major sustainability challenges we face today is the prevalence of single-use plastics. After serving their short-term purpose, these materials are typically discarded and sent to landfills. But what if that waste could have a second life? What if the problem could also be the solution?

The building industry is addressing the plastic waste problem by recycling and upcycling post-consumer plastics into composite products like flooring and decking. By shifting away from virgin material extraction and embracing a circular economy, manufacturers like Mohawk are reducing environmental impact while rethinking product lifecycles.

“For over 25 years, Mohawk has been engaged in PET recycling, diverting waste from landfills and incorporating post-consumer recycled content into their flooring products,” notes Denise Silbert, Vice President of Marketing at Mohawk.

Circularity and end-of-life considerations are often overlooked in the design phase. Yet Mohawk has been driven for decades by a vision to increase recycled content in its flooring products.

“Beyond single-use plastics, Mohawk has a broader focus on innovation and sustainability. We are particularly proud of the innovation in our PureTech and SolidTech R product lines, which are PVC-free flooring solutions,” Silbert adds.

Material selection is an integral part of the innovation process. Whether it’s increasing recycled content or introducing bio-based alternatives, these decisions shape how well a product enables wellbeing and high-performance living.

Mohawk’s RevWood, for example, is wood-based and naturally captures and stores carbon during its growth. “Because the amount of carbon stored exceeds emissions from manufacturing, RevWood is carbon negative from cradle to gate,” she explains.

Another example is SmartStrand carpet. “It’s made in part with a proprietary blend of bio-based fiber derived from corn, using regenerative farming practices,” Silbert says. “It’s incredibly soft, inherently stain-resistant, and qualifies for programs like USDA’s BioPreferred, LEED, and WELL.”

These Mohawk products, along with many others, demonstrate how material innovation can drive sustainability, comfort, performance, and wellbeing in indoor environments. By prioritizing thoughtful material selection and embracing product lifecycle thinking, Mohawk is turning challenges like single-use plastics into opportunities for lasting environmental impact.



MOHAWK

SPONSORED

The factory factor. Use of pre-built modules and components is rising rapidly in response to labor needs and market uncertainty.

SOURCE: SKYLINEHOMES.COM

IS U.S. HOUSING ON THE ROCKS OR PAUSING ON THE HIGH GROUND?

History shows that so far, the industry has worked around many challenges, and is poised to take advantage of the next big break.

Are we at the end of history? The beginning of a major recession? The golden age of AI-driven innovation? A national housing collapse? If your head's spinning, you're not alone. But remember, predictions about the future notoriously misfire. Do you remember these notorious prognostications?

- **Television won't last.** In 1946, film mogul Darryl F. Zanuck of 20th Century Fox said, "the public won't stand for staring at a plywood box every night." ([elon.edu](https://www.elon.edu))
- **Computers for home use won't catch on.** In 1977, Ken Olsen, founder and CEO of Digital Equipment Corporation, quipped, "There is no reason for any individual to have a computer in his home." ([snopes.com](https://www.snopes.com))
- **The world will run out of oil by the 1970s.** In 1956, geologist M. King Hubbert predicted that United States oil production would peak between 1965 and 1970. ([M. King Hubbert - Wikipediaen.wikipedia.org](https://en.wikipedia.org/wiki/M._King_Hubbert))
- **Nuclear energy will solve all of our problems.** By the mid-1960s, the U.S. Atomic Energy Commission anticipated there would be more than 1,000 commercial reactors supplying electricity in the United States by the year 2000—a forecast that never materialized. ([Nuclear power in the United States - Wikipediaen.wikipedia.org](https://en.wikipedia.org/wiki/Nuclear_power_in_the_United_States))

I'd like to zero in on housing predictions. The clickbait is dire: "Housing Market Collapsing!" "Florida Market in Freefall!" "Desperate Builders Offer 1 Percent Financing!"

In the real world, industry pros are concerned, yes, but not hysterical. For example, Paul Romanowski, CEO of D.R. Horton, told Reuters this spring that sales were off due to weaker consumer confidence and other factors. But he didn't gnash his teeth and tear out his hair.

We all know that builders face a trifecta of challenges: supply chain issues, labor shortages and persistently high interest rates.

But we're seeing smart companies find ways to overcome these obstacles. For example, Green Builder is working with two builders this year to develop new communities using factory-built modules and panels to solve labor problems. They'll be part of our VISION House series in coming months.

It's true that builders are stepping up amenities and in-house financing, but they're not extreme changes. Most deals merely sweeten the buyer's borrowing rate by a point or two lower. Also, we've seen many firms pivot smoothly to multifamily and rental projects, which are often easier to finance than for-sale properties.

Rather than describe the housing market as "teetering," you might look at it as poised for rapid growth. All that's needed is to pull one lever to change the game. A drop in interest rates, for instance, could quickly clear out excess inventory. Also, while other industries may lose a big part of their labor force to AI in coming years, construction is already short-handed. More homes and components built in factories are unlikely to steal jobs from the trades, but may ease the labor woes for project managers.

Where's sustainability in all this? Embedded in the process. Codes, rising utility costs and extreme weather are pushing the envelope organically. Homes are simply being built better to meet real-world challenges. **GB**



Matt Power
Editor-in-Chief

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As Climate Efforts Stall, The Mercury Keeps Rising

Earth could see its warmest temperatures ever by 2030.

Global temperatures are forecast to reach record or near-record levels during the next five years, setting the stage for more deadly extreme weather, according to a report from the World Meteorological Organization and UK Met Office. The agencies say that there is now a 70 percent chance that global warming over the next five years will exceed 1.5 degrees Celsius, which scientists have established as the low end of a “point of no return” toward environmental destruction.

According to a report by CNN, there is also an 80 percent chance that at least one year in the next five will be the warmest on record, the report suggests. There is also the remote possibility that one of those years will have an average temperature that is at least 2 degrees warmer than the era before humans began burning large amounts of planet-heating fossil fuels.

“We have just experienced the 10 warmest years on record,” says World Meteorological Organization Deputy Secretary-General Ko Barrett.

Housing Inventory is High, But Buyers Remain Wary

The warning signs of a recession—slowing sales and decreased public sentiment—are starting to come into view.

As tariff fears fade, analysts are turning to a new economic red flag: a slowing housing market that could tip the U.S. into a recession. According to a report in CRE Daily, the weakening housing sector is now seen by the investing market as the most immediate threat to economic stability. Public sentiment isn’t much better: According to Fannie Mae, 77 percent of Americans say it’s a bad time to buy a home, and the Home Purchase Sentiment Index shows a net minus 55 percent rating for buying conditions.

People are resistant to homebuying due to higher interest rates and job instability. Housing inventory is at its highest level since 2020, and although homes are still selling well in certain parts of the country, sellers are receiving only a few offers during the sale period instead of the couple dozen they received three years ago, according to a report in The New York Times.



Tipping point? What was once believed to be no less than 25 years away—a dangerous 1.5-degree Celsius increase in planetary temperature—may now occur by the end of this decade. CREDIT: ISTOCK/IAMYAI

“Unfortunately, this report provides no sign of respite over the coming years, and this means that there will be a growing negative impact on our economies, our daily lives, our ecosystems and our planet.” **GB**



Holding pattern. Economic analysts are carefully watching the U.S. housing market, which is where the next recession will first appear. So far, everything is holding together. CREDIT: ISTOCK/ANDRIL YALANSKYI

Still, current conditions are not doom-and-gloom enough to cause a panic, CRE Daily notes. “Housing may not cause the next recession, but it’s likely where we’ll see it first,” the report states. “From permits to pricing to consumer sentiment, housing is flashing early warning signs that the broader economy is running out of steam.” **GB**

Nuclear Soil Gets New Life in Japan

Following a 2011 accident, tons of radioactive dirt is ready to be put back to work.

Officials in Fukushima, Japan plan to repurpose soil from a nuclear power plant that went into meltdown after a massive earthquake in 2011, hoping to use the formerly contaminated material to build road and railway embankments and other projects. The Fukushima Daiichi accident created 14 million cubic meters of radioactive topsoil—enough to fill 10 baseball stadiums. And until recently, it was stored in a holding facility outside the city.

After a long decontamination process, some of the soil was mixed with asphalt, farm soil and layers of other materials to seal in radioactivity. According to a report from AFP News, roughly 75 percent of the stored soil now has a radioactivity level equivalent to or less than one X-ray per year for people who directly stand on or work with it. Local lawmakers want to use this cleaned-up material for projects outside of Fukushima, but there have been no takers. Instead, it will probably be allocated for smaller purposes within the city.

One such plan called for use in a public park; it has been put on hold indefinitely following an angry reaction by city residents. The environment



Hot topic. Fukushima, Japan authorities want to use cleaned-up soil from the city's 2011 nuclear accident as filler material for various construction projects.

CREDIT: JAEI IMAGE BANK/GIOVANNI VERLINI

ministry says it will step up efforts to explain the safety of its plan to the public later this year. **GB**

Colorado River Shrinkage Could Impact Utilities in 1.2 Million Homes

Climate change is expected to make a bad problem even worse.

The Colorado River basin has lost 27.8 million acre-feet of groundwater in the past 20 years, an amount nearly equivalent to the full capacity of Lake Mead, the largest reservoir in the United States, according to a study by Arizona State University. The river provides water to approximately 40 million people across seven U.S. states, as well as to millions of acres of farmland and enough hydropower to supply 1.2 million homes.

The groundwater loss is attributed primarily to overpumping by farmers, as well as wells dug over the past 20 years for many new homes, and water-reliant data centers and computer chip makers in Arizona, Nevada, California, Colorado, Wyoming, Utah and New Mexico. Lack of regulation also plays a part, according to study lead author and hydrologist Jay Famiglietti. Rising average temperatures, and more frequent and severe droughts, are expected to make the region's water



In decline. As record heat continues, the depth of the Colorado River—above ground and beneath—and the capacity of Lake Mead continue to diminish, immediately impacting seven states and threatening the rest of the nation.

CREDIT: ISTOCK/BLOODUA

shortages worse.

Groundwater is disappearing 2.4 times faster than the river's surface water. Meanwhile, the Colorado's surface flow has decreased by about 20 percent in the past 100 years. "Everyone in the U.S. should be worried about it," Famiglietti notes. "We grow a lot of food in the Colorado River basin, and that's food that's used all over the country." **GB**

AI to Reshape the Housing Landscape?

When it comes to yard maintenance, Gen Z is leaning toward robotic technology.

Caring for a home's lawn and landscape could become far less personal: According to a report by green software maker RealGreen, 80 percent of Gen Z homeowners would consider using AI-driven lawn care, and 54 percent of all homeowners surveyed would replace their human landscaper with robotic tools. Reasons for the switch include water conservation, maintenance service cost, outdated HOA agreements, lack of time, and even combatting the government's recent federal environmental funding cuts.

In the latter case, "these shifts suggest that political inaction at the top may be sparking a grassroots movement (so to speak), starting right in our backyards," the report notes. That finding seems most true among younger generations: 45 percent of Gen Z homeowners and 36 percent of millennials plan to adopt more eco-friendly yard care practices.

For now, muscle still rules. Sixty-nine percent of homeowners maintain their lawns themselves, while only 14 percent outsource the yardwork, according to the survey. Seventeen percent split the maintenance between manual labor and professional help. And while homeowners expect that AI



Touchless technique. Maintaining a yard by hand will become far less common as people shift toward the use of AI and robotics. CREDIT: ISTOCK/FINN HAFEMANN

will shake up the industry, with 46 percent believing it will partially replace human workers, only 14 percent think it will take over completely.

[Report results are available](#) on RealGreen's website at www.realgreen.com. **GB**



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Study: Foreign Faucets May Be Made with Toxic Materials

Analysis of more than two dozen brands found high levels of lead and other hazardous materials.

Ninety percent of off-brand, foreign-made faucets, when tested, failed to meet American safe drinking water standards, according to research by the International Association of Plumbing and Mechanical Officials (IAPMO). Market data indicates that up to 35 million of the faucets imported into the United States between 2020 and 2024 can potentially expose millions of Americans to high levels of lead and chemicals.

The majority of 25 faucets tested in the [recent study](#) were found to leach lead at 356 percent to 591 percent higher than the safety standard high levels. Lead exposure is known for its negative health effects, although further research would be needed to determine exactly how much risks the faucets would pose in a typical household usage pattern.

“In recent years, off-brand, foreign-made faucets have entered the American



Washing out. Safety testing conducted on 25 off-brand faucets revealed that they leach almost five times more lead than is considered safe for human use.

CREDIT: ISTOCK/MAPODILE

market with prices so low that we were skeptical that the products were safe for use, and we were right,” says Aaron Bores, executive vice president of product development at Fortune Brands Innovations, the parent of bathroom products maker Moen, and the company that commissioned the study. “The third-party testing results were more egregious than we had expected.” **GB**

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¹Based on comparison of a Rheem RTG/RTG-R Series model against a standard residential 50-gallon tank type model with like fuel type.



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THE GREAT DISRUPTION



BY GREEN BUILDER STAFF

In this era of political and climate upheaval, many players in the housing industry are holding on for a wild ride. Will things be better or worse tomorrow? What does their business—and personal—future look like?

Builders and developers are creating their own pathways through chaos, developing new ideas about how to survive, thrive and change some of the foundational rules of homebuilding. Some got an early start and are more likely to withstand any challenges. Others are quickly getting on board now that they see where the construction market is headed.

Here are several large- and medium-sized builders who have undertaken bold innovations on a community scale. From geothermal communities to ultra-fire-resistant neighborhoods, they're putting the best products and processes to work to solve urgent housing challenges.

Peak performer. A Beazer Energy Series READY home, such as this one from the builder's Willow at Winding Creek project, is Energy Star certified, Indoor AirPlus qualified and designed to be up to 50 percent more efficient than a typical new house. CREDIT: GREEN BUILDER MEDIA/ALAN NADITZ



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Three of a Kind

When it comes to efficiency, Beazer Homes' Energy Series projects are keeping the company at the front of the pack.

BY ALAN NADITZ

For Beazer Homes, over the past four decades, it's been about energy—as in, how to build a house that is as energy efficient as possible. The Atlanta-based company's communities, found in 13 states (Arizona, California, Delaware, Florida, Georgia, Indiana, Maryland, Nevada, North Carolina, South Carolina, Tennessee, Texas, and Virginia), are, in the words of Luke Wissmann, division president for **Beazer Homes** in Sacramento, California, “designed with cutting-edge, energy-efficient features.”

Those energy efficiency elements provide big benefits for homeowners. “With better home performance, homebuyers can save money on energy bills, enjoy improved air quality for healthier living, and live more comfortably

in their homes,” Wissmann adds.

The company has developed a reputation for constructing homes that are ahead of current standards. In 2024, Beazer became the nation's **No. 1 builder of the Department of Energy (DOE)'s Zero Energy Ready Homes (ZERH)**, under its **Single Family National Program**. It's also the first U.S. national homebuilder to publicly commit to having every single-family home built to ZERH program standards by the end of 2025.

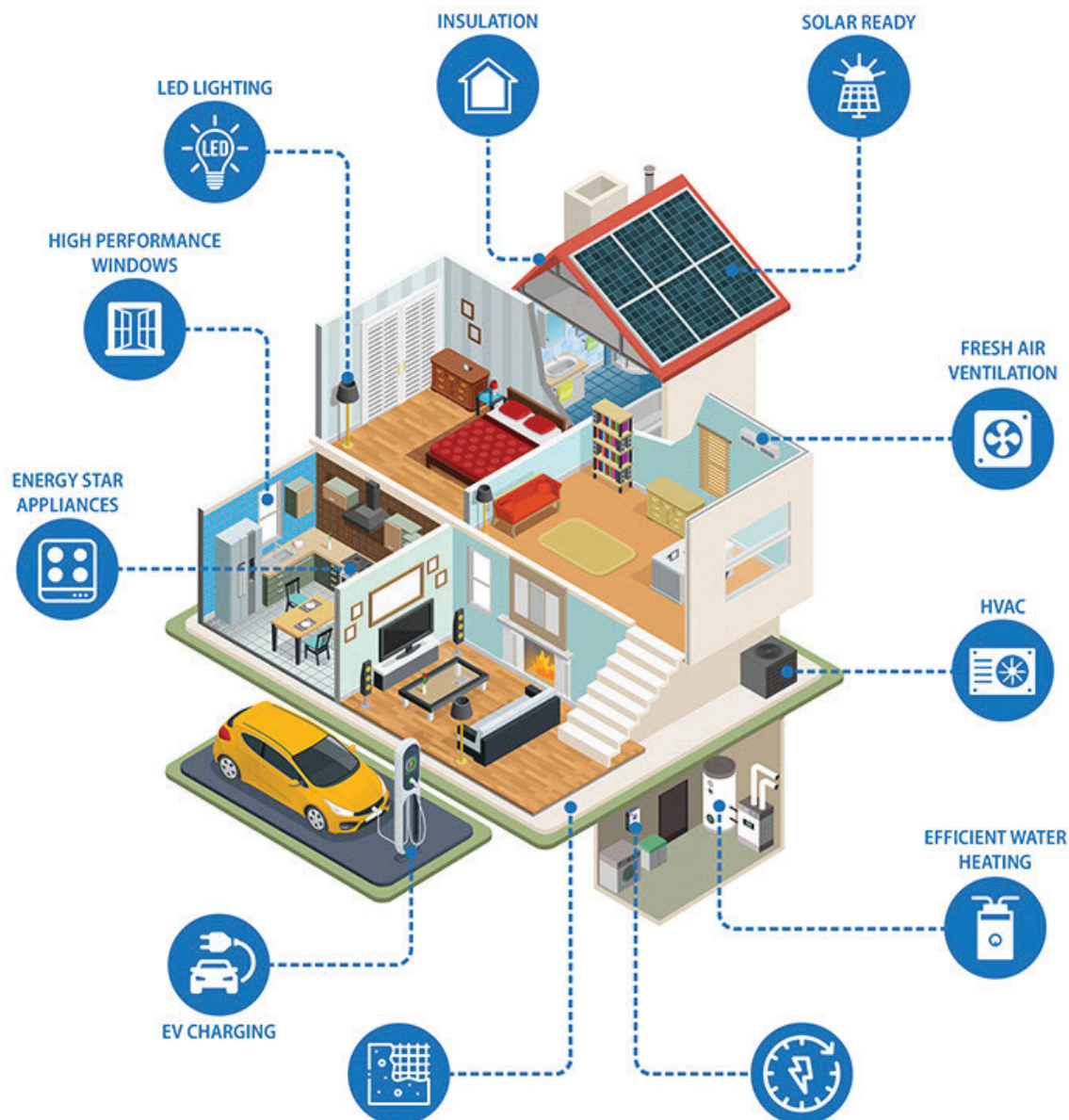
According to DOE's website, ZERH is a high-performance home that is so energy efficient that a renewable energy system could offset most or all the home's annual energy use. Each home meets rigorous efficiency and performance criteria and is verified by a qualified third party as part of the certification process.

THREE FACETS OF ENERGY SAVINGS

Beazer fine-tunes the ZERH program with its all-electric Energy Series homes, which the company has been gradually rolling out nationwide over the past few years. There are three variations of these houses: STAR, PLUS, and READY.

STAR homes are ENERGY STAR certified, Indoor AirPlus qualified, and rigorously reviewed by third-party inspectors. According to Beazer, STAR homes perform better than homes built just to energy code requirements.

PLUS homes receive enhanced construction features to deliver a tighter, more-efficient home. In addition to being Energy Star certified and Indoor AirPlus qualified, PLUS homes have higher-performing low-E windows, HVAC



Full house. To be a certified Zero Energy Ready Home (ZERH), a single-family dwelling must include numerous energy efficiency elements, including Energy Star appliances, electric readiness and safe building materials. CREDIT: U.S. DEPARTMENT OF ENERGY

equipment and ductwork in conditioned spaces, and more.

READY homes are among the most energy-efficient homes built today, the company notes. These are Energy Star certified, Indoor AirPlus qualified and, according to the DOE, designed to be 40-50 percent more efficient than a typical new home. READY homes also receive behind-the-wall preparation for easy addition of a solar energy system.

“A Beazer team is hyper-focused on including premium materials and high-caliber construction processes designed to increase performance and efficiency,” the company notes. “A READY home defines

what it means to build ahead of standards and expectations.”

MAKING IT WORK

The Energy Series READY homes have a subcategory, READY Plus Solar. These homes are ZERH certified and are so energy efficient that most, if not all, of the annual energy consumption of the home is offset by solar, according to the company. Select READY Plus Solar homes come with solar panels preinstalled; non-Plus Solar dwellings can be easily upgraded at the owner’s cost.

Rooftop solar panel systems can be paired with a power storage system which

uses one or more batteries to hold solar-generated energy. The stored energy can keep a home online during an outage, and it helps cut the cost of using the house’s preinstalled electric vehicle charger.

This type of integrated system “aims to provide a seamless, aesthetically pleasing, and energy-producing solution for homes,” according to Beazer.

There are also a number of unique out-of-sight design elements that improve home performance and maintain ideal temperatures, giving homeowners control over their comfort, and saving them money on energy costs.

These include use of R-49



Clean energy integration. Some Beazer Energy Series READY homes, such as this one at the Klausmeier Farms community, include rooftop solar panels and an energy storage system for efficient, clean and cost-cutting power production.

CREDIT: DAVID KEITH PHOTOGRAPHY

insulation—compared to code standard R-30—which provides superior environmental temperature control for very hot or cold climates; a **rheia** HVAC/duct system for optimal airflow distribution; and 2-by-6 framing (as opposed to 2-by-4), which allows for use of more insulation and results in better energy efficiency.

Wall plug outlets are rectangular instead of the traditional oval, which nearly eliminates an airflow gap that makes a ventilation system less effective at cleaning the air of dust, allergens and other pollutants. As a result, air within a Beazer home only needs to be refreshed about 1.5 times per hour, compared to the building standard of 4 air changes per hour. Energy use drops by about 63 percent.

Beazer Homes also utilizes *DuPont's*



Unimpeded airflow. A rheia HVAC/duct system provides optimal distribution of hot or cold air as needed. CREDIT: GREEN BUILDER MEDIA/ALAN NADITZ

Thick thinking. The Energy Series homes feature R-49 insulation, which provides superior effectiveness in very hot or cold climates. CREDIT: GREEN BUILDER MEDIA/ALAN NADITZ



Logically frugal. LED lighting and low-emission dual-pane windows are among items that enable the home to do as much as possible with the smallest amount of electricity.

GREEN BUILDER MEDIA/ALAN NADITZ



Open wide. Use of wider 2-by-6 framing allows for more insulation, which leads to better energy efficiency and temperature control. CREDIT: GREEN BUILDER MEDIA/ALAN NADITZ



Wrapper's delight. Beazer makes exclusive use of the DuPont Tyvek Weatherization System to enhance year-round in-home comfort. CREDIT: GREEN BUILDER MEDIA/ALAN NADITZ

Changing time. Rectangular plug outlets nearly eliminate an airflow gap that normally makes a ventilation system 63 percent less effective at cleaning the air of dust, allergens and other pollutants.

CREDIT: GREEN BUILDER MEDIA/ALAN NADITZ



Water-friendly appliances. Energy Star appliances, such as this Whirlpool dishwasher, help keep water costs to a minimum. CREDIT: GREEN BUILDER MEDIA/ALAN NADITZ

complete Tyvek Weatherization System, including Tyvek HomeWrap, to enhance energy efficiency and provide a barrier against the elements.

There are also the expected power savers, including electric heat pumps and induction stoves, Energy Star certified appliances, Aero Barrier air-sealing technology that prevents energy-wasting leaks, smart thermostats, and LED lighting.

AFFORDABILITY ASPECTS

In addition to helping cut energy costs, Beazer is making it easier to buy a home. The company's [Mortgage Choice](#) program enables a prospective homeowner to receive and compare offers from multiple lenders, including make-or-break details such as interest rates, fees and payment terms. Offers are also tailored to the customer's specific financial situation. These aspects help a buyer find the offer that is best for them.

Beazer's "Choice Lenders" must maintain a customer satisfaction rating—based on the reported experiences of previous homebuyers—of at least 90 percent to compete for a potential buyer's business. "Our goal is to create an engaging and satisfying customer experience," notes Beazer CEO Allan Merrell, "so that you can make the right decision and enjoy buying, building, personalizing and living in your new home."

Born to (not) be wild. The Dixon Trail subdivision is designed to be more wildfire-resilient than any others, largely due to the handling of landscape and housing design. CREDIT: COURTESY OF KB HOME



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Trail Blazer

This KB Home Southern California subdivision is setting a new standard in fire prevention.

BY ALAN NADITZ

In January, more than 18,000 structures were destroyed and 57,000 acres burned by a series of wildfires in Southern California. In March, [KB Home](#) unveiled an example of how to prevent that type of devastation in the future: [Dixon Trail](#), a 64-home community in Escondido, California, that is designed as the nation's first wildfire-resilient housing project.

Roughly half of the \$1 million-plus custom homes are complete. Those—and the ones to come—were or will be built to stringent house and neighborhood-level wildfire resilience standards developed by the [Insurance Institute for Business & Home Safety](#) (IBHS). The South Carolina-based nonprofit research firm's [Wildlife Prepared Home Plus](#) certification is given to homes that take steps to “meaningfully

reduce wildfire risk to their home and property.” IBHS also offers safety guidance for homes in high wind, hail and rain areas.

According to IBHS, the Dixon Trail project will, during its buildout, receive a provisional neighborhood-level designation based on its design, confirming that the community has implemented preventative measures to “reduce the likelihood of initial ignitions from an approaching wildfire.” Once the neighborhood is completed and has passed an IBHS evaluation, it will receive a *Wildfire Prepared Neighborhood* designation.

This will be the first time that IBHS is granting certification to an entire community, as opposed to individual homes, according to the nonprofit.

In Dixon Trail's case, certification means each home has Class A fire-rated roofing (primarily asphalt fiberglass composition shingles), noncombustible gutters, ember- and flame-resistant vents, upgraded windows and doors, and a 5-foot noncombustible perimeter buffer and 5-to 30-foot defensible space zone around the house to protect it from catching fire. Those safeguards are already required by the California Department of Insurance (CDI) for individual residences in fire-dangerous areas.

At the neighborhood level, wildfire risk is further reduced via requirements such as maintaining a defensible space of at least 30 feet, decreasing potential fuels through use of fire-resistant materials such as all-metal fence systems and fake window shutters made of stucco,



Full house. Massive Southern California wildfires—such as the Palisades Fire in January—have made fire-resilient homes a priority for builders and homebuyers.

CREDIT: U.S. FOREST SERVICE



Combustible challenge. A resistance test in 2024 revealed that a shed built to 1980s standards (left) can't hold up to a fire, while one constructed under 2008 standards (right) isn't harmed.

CREDIT: COURTESY OF INSURANCE INSTITUTE FOR BUSINESS & HOME SAFETY



In the clear. *Wildlife Prepared Home Plus* certification and the California Department of Insurance require a noncombustible perimeter buffer and defensible space zone around each house. CREDIT: COURTESY OF KB HOME

and ensuring there is at least 6 inches of vertical noncombustible material at the base of exterior walls and decks. Homeowners will also need to do their part through actions such as cleaning debris from roofs and gutters, IBHS notes.

According to Steve Ruffner, president of KB Home Coastal, Dixon Trail's development was already underway when he saw an IBHS fire-resistance demonstration in 2024. In the demo, flammable landscaping in front of two side-by-side sheds—one built to 1980s code, and the other to California's wildfire building code from 2008—was set ablaze. "I was shocked," Ruffner told USA Today. "The one built to the 1980s code burned down in 45 minutes. The other one didn't burn at all."

That led to a quick redesign of the Dixon Trail project, with KB Home using the IBHS standards as a template.

Jeffrey Mezger, KB Home's chairman and CEO, says the company is proud to be IBHS' initial community-level *Wildlife Prepared Home Plus* designation recipient. "In keeping with our tradition of innovation, we are [also] pleased to offer today's buyers the ability to choose a wildfire-resilient home and community," Mezger notes.

HOLDING THE (FIRE) LINE

From a fire safety standpoint, Dixon Trail is a perfect example. Escondido, a 151,000-person city about 30 miles from downtown San Diego, has had its own brushes with danger. In 2007, 50 homes

were destroyed by the 198,000-acre Witch Creek Fire; it was the largest wildfire in city history. In 2014, 12 single-family homes burned from the 2,000-acre Cocos Fire. Numerous other tiny wildfires have occurred throughout this century.

The fact that all Dixon Trail homes have been or will be built to fire-resilient standards makes wildfires less of a concern than for individual homes scattered within a neighborhood, according to IBHS. A wildfire-prepared community can be a passive fire break because it can prevent a blaze from leapfrogging house to house within the subdivision. In turn, the fire can be kept away from less-protected homes nearby.

That makes the IBHS designation even more impressive, the nonprofit notes.



Not a good neighbor. State Farm is one of several big-name insurance companies that have ended coverage or dramatically raised rates for California residents due to several years of highly destructive wildfires. CREDIT: STATE FARM GENERAL





Glass in house. Fire resilience items include windows with two panes of tempered glass, which will not shatter in heat. CREDIT: COURTESY OF KB HOME

Earlier designation attempts by other subdivision builders, as well as owners of new and existing homes elsewhere, could have lessened destruction caused by recent major fires.

January's disastrous blazes in the Altadena, Pacific Palisades, and Malibu neighborhoods surrounding Los Angeles highlighted the wildfire risk [many California homes face](#). Economic losses of roughly \$250 billion made the combined wildfires into one of the costliest natural disasters in U.S. history, according to AccuWeather.

Months later, the risk of disaster remains. Across Southern California, the number of areas with a "very high fire hazard" have increased by 26 percent since 2011, according to the California

Department of Forestry and Fire Protection (CAL FIRE).

But there may be a benefit. According to a report in *Fortune*, many home insurers are no longer offering or renewing plans in California, while others are reducing coverage and/or raising insurance rates at a national level every year. This includes national giants such as Allstate, Farmers Insurance Group, State Farm, The Hartford, and Nationwide subsidiary Nationwide Private Client.

CDI is actively promoting "home hardening" through its "Safer from Wildfires" program. The program encourages homeowners to implement wildfire safety measures similar to those at Dixon Trail, which would make owners eligible for potential insurance discounts.

Reducing a home's risk profile, which could then lower its insurance premium, would "continue with the affordability mission that we've been on for many years," said Jacob Atalla, KB Home's vice president of sustainability at KB Home, in a report in *Fortune*.

Residents of homes throughout Southern California should take similar safety actions, according to Ruffner.

"Frankly, this can be done at a reasonable price," Ruffner said, in a report in *Fortune*. "If you live in an area where you could be impacted like this, you could do a lot of this stuff to your home."

Ruffner added that KB Home plans to share what it learns from these fire safety actions with other California builders in the hope that the whole industry will continue to adapt.

Open land. Lennar Corporation's partnership with Dandelion Energy will result in 14 new subdivisions in Colorado over the next two years.

CREDIT: WIKIPEDIA.ORG

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Going Geothermal

A partnership between Lennar Corporation and Dandelion Energy will mean big things for natural climate-controlled housing.

BY ALAN NADITZ AND SARA GUTTERMAN

Don't say **Lennar Corporation** doesn't like to do things big. The Miami-based homebuilder recently announced a partnership with Arlington, Virginia-headquartered **Dandelion Energy** that will equip more than 1,500 new Colorado homes with cutting-edge geothermal heating and cooling systems over the next two years.

The project, one of the largest residential geothermal deployments in U.S. history, marks a transformational moment for energy-efficient home construction: Dandelion is bringing affordable geothermal into the mainstream, while Lennar will expand its Colorado presence by 14 communities over the next two years.

Geothermal heat pumps (GHPs) tap into the earth's stable underground temperatures to deliver highly efficient heating and cooling.

According to the Department of Energy, widespread **adoption of GHPs could eliminate the need for 24,500 miles of new grid transmission lines**—roughly eight cross-country trips.

Until recently, geothermal has been viewed as a premium-priced option for new homeowners. This project will prove that geothermal can scale and deliver massive value to both builders and buyers, according to Dandelion Energy President Kathy Hannun.

Lennar is Colorado's highest-volume builder. The Dandelion Energy venture will mean a large percentage of the state's newer homes will use geothermal heat pumps within two years.

"Our collaboration with Dandelion Energy brings innovative geothermal technology into our homes—offering Colorado homeowners

a cleaner, more efficient way to heat and cool their homes, while reducing long-term costs and future-proofing their investment," says Lennar Executive Chairman and co-CEO Stuart Miller. "It supports our broader commitment to making high-quality, attainable housing more accessible."

WHY GEOTHERMAL?

The benefits are tangible. For starters, **geothermal should lower monthly energy bills** by about 17 percent. The Lennar-Dandelion partnership is expected to save homeowners a combined \$30 million over the next 20 years when compared to traditional air-source heat pumps.

The savings are by design—literally. Temperatures above ground vary throughout the year, resulting in a need for climate control



View from the air. Each house at the Ken-Caryl Ranch subdivision, Lennar Corporation's first joint venture with Dandelion Energy, will include a geothermal energy system—something that is usually added to higher-end homes. CREDIT: COURTESY OF DANDELION ENERGY

units such as air conditioners, natural gas- or fossil fuel-powered heaters and HVAC units. In contrast, the temperature just a few feet below ground averages about 55 degrees to 70 degrees Fahrenheit year-round.

In the summer, as outdoor temps rise, a GHP collects unwanted heat in a home and moves it to the cooler earth. On the other hand, ordinary air conditioners dump excess warmth outside, but hot summer air is already saturated with heat. That makes ordinary cooling systems least efficient when needed the most. A similar process happens during cold weather.

The heart of the geothermal system is small-diameter, high-density polyethylene (HDPE) pipes buried underground (a.k.a., a "loop"). The loop circulates earth-heated or cooled water to and from the home.

While large areas such as dorms on a college campus or an auditorium rely upon a community-scale shared loop system, each home in the Lennar-Dandelion project will have its own dedicated geothermal loop. The companies note that single loops mean lower cost, fewer points of failure, and no ongoing operations and maintenance complexity.

THE POWER OF SCALE

What makes this project so groundbreaking (so to speak) isn't just the technology—it's the approach.

Dandelion and Lennar have worked together informally in the past, with the former installing systems in several of the latter's model homes. This triggered interest in geothermal among potential buyers, and this interest was boosted by Colorado's many



Coming soon. Lennar's in-progress community, Ken-Caryl Ranch, will showcase the merits of geothermal heating and cooling. CREDIT: COURTESY OF DANDELION ENERGY



Hot stuff. Dandelion Energy's *Geo Heat Pump* uses a plate heat exchanger and a proprietary air coil design to move heat from the ground to the home and back super efficiently. CREDIT: COURTESY OF DANDELION ENERGY

electrification-related incentives—including manufacturer rebates, and state and federal geothermal tax credits. The incentives often came as a pleasant surprise to buyers, and ultimately, they offset a home's higher price tag.

The smaller individual projects led to the realization that community-level efforts could cut prices further. For example, it costs the same to send a drilling rig to one house as it does to send it to a new neighborhood of 10 homes. The operating cost is split by 10, with the lower expense passed on to the home's selling price.

In such a scenario, geothermal systems to Lennar's homes can be installed at less than half the cost of installation in a conventional one-off. The overall housing price for single-family homes and townhomes built by Lennar

Grounded. Homes at Ken-Caryl Ranch will feature earth-heated high-density polyethylene (HDPE) piping for naturally cooled and heated water.

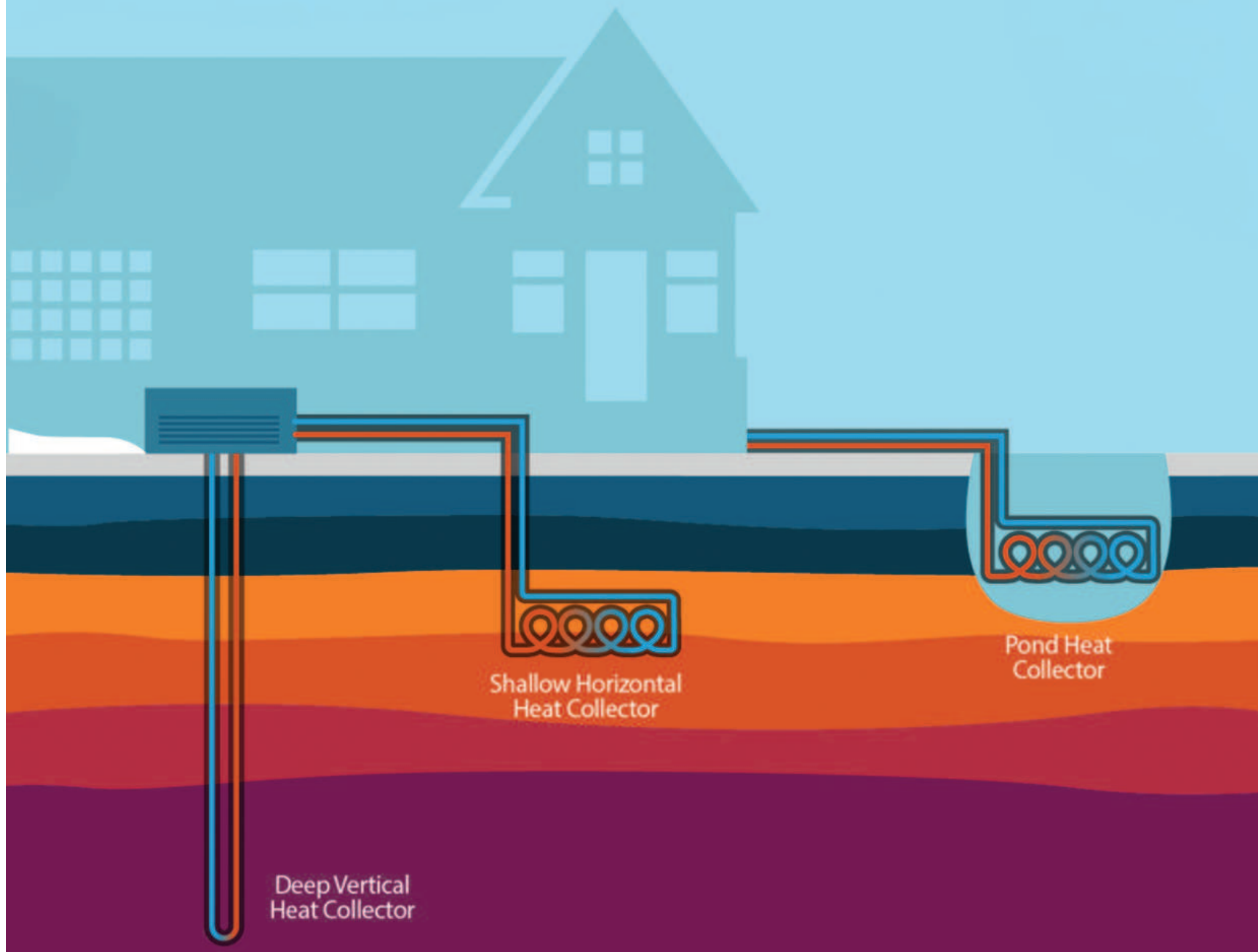
CREDIT: COURTESY OF DANDELION ENERGY



Dollar smart. Construction costs, such as land drilling, are drastically lower per house when part of a large community.

CREDIT: COURTESY OF DANDELION ENERGY

HEAT PUMPS



with geothermal will not be much higher than they would with conventional gas furnaces and air conditioners.

That last point will help convince middle-class buyers that installing geothermal is not only affordable for the wealthy. “It’s going to be a real eye opener for a lot of folks to internalize that a builder with the reputation and the cost-conscious profile of Lennar can introduce geothermal into that framework,” notes Dandelion Energy CEO Daniel Yates.

A FUTURE TEMPLATE?

The Lennar-Dandelion Energy project could well be a tipping point for both companies, and for the geothermal industry as a whole. Geothermal could go from niche to norm.

“Lennar is a pragmatic builder,” Hannun notes. “They’re doing this because it makes economic sense for them and their buyers. That kind of stakeholder alignment is what enables scale.”

Lennar agrees. “We forge strong

Natural occurrence. Geothermal heat pumps use the constant underground temperatures of the shallow earth as thermal storage that enables efficient heating and cooling.

CREDIT: U.S. DEPARTMENT OF ENERGY

relationships with forward-thinking companies that share our core values,” the company notes. “Investing our capital and our business enables us to drive financial growth and a better, more-sustainable future.”



Multipurpose planning. Low-carbon concrete, geothermal heat pumps and various structural designs at the mixed-use Carding House have reduced operational carbon emissions by about 29 percent annually. CREDIT: COURTESY OF MATTAMY

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Leading by Example

From low-carbon concrete to carbon-smart decision making, Mattamy Homes is rewriting the rules of residential construction.

BY SARA GUTTERMAN AND ALAN NADITZ

At a time when the building industry is still coming to terms with its carbon footprint, **Mattamy Homes** is leaning in hard. One of the largest privately owned homebuilders in North America is now focused on a huge elephant in the room: embodied carbon.

Embodied carbon is the amount that is emitted during construction, maintenance and tear-down of a building. This includes the carbon emitted from extracting raw materials, processing and manufacturing building materials, transport, construction, maintenance, repair, replacement and, at end of life, taking down a building and

disposal of the materials.

Mississauga, Ontario-based Mattamy likes to be an example of how things should be done. “We want our carbon footprint to be as small as possible,” says Philip Squires, Mattamy’s corporate vice president of sustainability and procurement. “All carbon production has an impact on climate change,



Delayed benefits. In situations where carbon emissions are already low, solar panels can initially be an environmental negative because of fossil fuel-based production methods. But the panels quickly become carbon neutral after installation. CREDIT: ISTOCK/PK24

whether it's operational or embodied emissions."

ROCK SOLID RELATIONSHIPS

The first step toward embodied carbon cleanup: Partnering with concrete manufacturers across North America to guarantee that the mixes used on their sites are verified low-carbon blends. That's a big deal, considering that concrete alone is responsible for more than 8 percent of global CO₂ emissions, Squires notes.

"Concrete can be a major contributor to carbon emissions," he says. "We work diligently to lower the impact concrete can have on our environment."

A grand example is [Carding House](#), a five-story mixed-use development in Oakville, Ontario that includes 157 condominium units. According to the company, the project represents a significant step forward in reducing operational carbon emissions—in this case, cutting it by as much as 29 percent annually when compared to Ontario Building Code requirements. It achieves this by using a geothermal system and ground source heat pumps for the building's heating and

cooling, "a testament to the development's commitment to sustainability."

Carding House also achieved an embodied carbon intensity that is 16 percent less than Mattamy's historical average embodied carbon. Measures taken to reduce embodied carbon in the project included use of low-carbon concrete, and rebar that was manufactured using electric-arc furnace technology. The upper floors of the development were constructed using a combination of hollow-core slabs, prefinished exterior insulation and finish systems, cold-formed steel walls and cast-in-place concrete.

As part of its partnership, Mattamy uses several brands of low-carbon concrete, including [Holcim ECOPact](#) and [CEMEX Vertua](#). Brands are selected based on the housing project's location. "The building sector accounts for nearly 40 percent of our world's CO₂ emissions," notes Holcim. "Decarbonizing the built environment is therefore essential for a net-zero future."

DETERMINING TRUE VALUE

Mattamy is also redefining how decisions about solar energy installations are made.



Education first. Keeping up to date with the latest products, technology, and training ensures that builders are able to remain relevant in an ever-changing construction world.

CREDIT: COURTESY OF MATTAMY

Their decisions are not just based on marketing or incentives, or what Squires calls ROCI, or "Return on Carbon Invested."

A typical example: In certain Canadian markets where the grid is already clean, adding rooftop solar can sometimes increase a home's total carbon footprint due to the embodied carbon in the panels themselves. "We use third-party building science professionals to evaluate the embodied and operational carbon impacts of products," Squires explains. "If the ROCI doesn't meet our threshold, we look for better options."

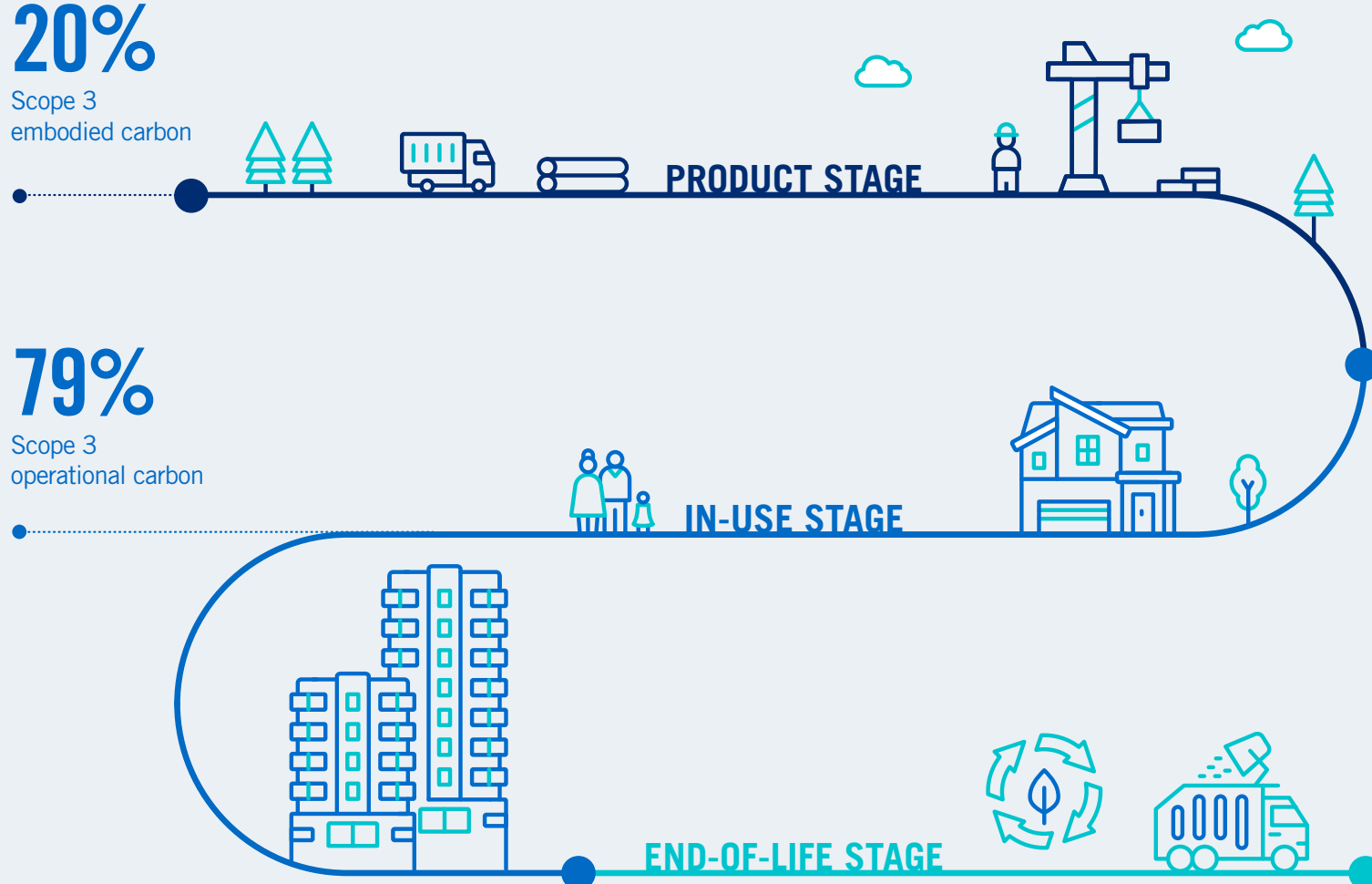
This analytical approach reflects a deeper commitment to carbon literacy within the company. But translating that into a value proposition for consumers—especially in a market fixated on price-per-square-foot—is no small feat.

The breakthrough moment came when the company started looking beyond the upfront price to the total cost of home ownership. "The cost of home ownership includes taxes, insurance, and utilities," Squires says. "If we can reduce utility costs through better performance, the total cost of the home might not change—even if it's

WHOLE BUILDING LIFE CYCLE ASSESSMENT

20%

Scope 3
embodied carbon



● PRODUCT STAGE

Emissions generated by creating and transporting materials used in building a home and the subsequent construction.

● IN-USE STAGE

Emissions created by all the activities associated with home life.

● END-OF-LIFE STAGE

Emissions produced by deconstructing a home and material disposal.

Life experience. One-fifth of the overall carbon generated during a building's life cycle comes at the beginning stage during creation and transportation of products, and the subsequent construction. CREDIT: COURTESY OF MATTAMY



Aired out. Low-carbon concrete blends, such as *ECOPact* by Holcim, help offset the traditional product that is responsible for more than 8 percent of global CO₂ emissions.

CREDIT: COURTESY OF HOLCIM



Carbon emissions conqueror. As one of North America's largest privately owned homebuilders in North America, Mattamy Homes focuses on creating homes that reflect how people live and breathe, emphasize architecture, and promote sustainability and wellness. CREDIT: COURTESY OF SAGIPER NORTH AMERICA

Mattamy Homes Energy Achievements for FY2024

2,672

ENERGY STAR-related homes closed in the U.S. and Canada.

304

Net Zero Ready homes closed in Canada.

1,360

homes meet EcoSelect or Florida Green Building Coalition (FGBC) in the U.S.

58%

of U.S. homes closed received HERS® ratings.

Banner year. Mattamy Homes had a solid 2024 fiscal year, with ENERGY STAR and Net Zero Ready home closures increasing by almost 65 percent, and EcoSelect-FGBC certifications tripling from fiscal 2023.

CREDIT: COURTESY OF MATTAMY

a higher-performance house.”

Still, challenges remain. Low-carbon materials often come at a premium price. Or worse, they aren't available in every market. “Why are we still being charged more for green products that would clearly make the industry better?” Squires asks. “If we can provide homes with lower operational costs and greater resilience at the same sale price, what are we waiting for?”

COOPERATION AND COMMUNICATION ARE KEY

When it comes to progress in embodied carbon reduction across the industry, Squires points to innovations in concrete and drywall, where lower-carbon versions are already in use. But he also notes that too often, greener versions of standard materials are treated as premium options. “Anything that's available in a lower-carbon version should be the standard for everyone,” he notes. “That's how we get economies of scale.”

Cooperation among builders and other industry supporters is key. In June 2024, the [Climate Smart Buildings Alliance](#) (CSBA), a

joint effort between Mattamy, construction services company [EllisDon](#) and [RBC](#) (a.k.a., the Royal Bank of Canada) launched the *Responsible Buildings Pact*. This is a voluntary agreement for any developers, consultants, contractors, and supporters interested in working together to reduce the embodied carbon of buildings they create. Participants agree to remain educated on lower-carbon materials, establish an internal process to consistently evaluate whether lower carbon materials or design strategies can be used, and report publicly on the results of evaluations and the use of lower carbon materials.

Twenty-three signatories and supporters were on board with the pact when it was announced. One year later, the number has grown to 40, CSBA reports.

“Most builders have their own sustainability targets, but for any of us to succeed, we need everyone to be moving in the same direction,” notes Brad Carr, CEO of Mattamy Homes Canada. “We can only get more low carbon materials and technologies in the market if others in the industry are also sending the same signal to suppliers. The Pact will help

us coordinate and collaborate towards shared climate objectives.”

So can a business move beyond incremental gains to a true “moonshot” moment? For Squires, it starts with mandatory reporting. “There needs to be a standard way to track and report embodied carbon,” he says. “And manufacturers should be required to publish Environmental Product Declarations (EPDs) for everything they make.”

Squires doesn't see regulation as the main hurdle—he sees culture and mindset as the real drivers of transformation. “The change will be brought about by accountability,” he says. “Our customers are starting to demand more from us, and we're demanding more from our suppliers. That's what will move the needle.”

Another huge challenge: apathy. “We know how to build more resilient homes with lower operational costs, but we still face resistance when it comes to adoption,” Squires says. “Let's push manufacturers to make high-performance products the default. Lower SKU counts. Higher profits. Better results for the planet.”



Inaugural appearance. The Pearl Concept Home made history in 2019 as the world's first single-family residence to receive LEED Zero Certification, largely due to the incorporation of groundbreaking new green technology. CREDIT: COURTESY OF PEARL HOMES

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LEEDing the Way

For Pearl Homes, starting small turned into a world-worthy benefit.

BY ALAN NADITZ

Sometimes, being a leader means being the first to do something unique. Sometimes, it means setting an example that everyone else can follow. In [Pearl Homes'](#) case, it's both.

In 2019, the Palmetto, Florida sustainable housing developer became the world's first to receive LEED Zero Certification for a residential project. That project, [The Pearl Concept Home](#), paved the way for other builders to pursue and achieve [LEED certification](#), which rates houses on how they emphasize environmental health—particularly decarbonization; quality of life; and ecological conservation and restoration.

As of 2024, more than 46,000 residential projects worldwide have received some form of LEED certification, according to

the U.S. Green Building Council (USGBC), which oversees the LEED program. LEED now has four residential net zero classifications: Carbon, Water, Waste and Energy. By today's standards, the concept home falls into the last category.

The various sustainable and environmentally friendly aspects of the concept model home might seem tame today because they are largely expected by buyers. But six years ago, combining these features was groundbreaking: [Google Home Smart Home Technology](#) (such as [Nest cameras and thermostats](#)), rooftop solar arrays paired with a [sonnen intelligent residential energy management system](#), a [TOTO](#) smart toilet and shower, [GE ENERGY STAR](#) appliances, [Moen](#) WaterSense high-efficiency fixtures,

smart irrigation, and more. The home was built with sustainable materials, including steel, aluminum, timber, precast concrete, and carbon filter structure, and could function on its own power grid thanks to 16 kilowatts of backup power.

A LEAP OF FAITH

Pearl Homes, which launched in 2015, spent its first few years building a reputation as a premier sustainable housing builder in Manatee County, Florida. It was closing out Mirabella, a 160-home, active adult, single-family subdivision—which became the nation's largest all-LEED Platinum-certified residential community—when the company decided to take the next step: an entirely LEED Zero Energy subdivision.



Built to last. Pearl Concept was built with sustainable materials, including steel, aluminum and timber, and included energy savers such as LED lighting. CREDIT: COURTESY OF PEARL HOMES

At the time, there was no guarantee it would work—not even a single LEED Zero home had been built in the U.S., let alone a several-dozen-home subdivision. The company built a 540-square-foot, two-bedroom, one-bath concept home in a warehouse. It then spent 18 months testing ways to make the dwelling at least net zero, where the energy produced by the home through solar or other means matches the amount needed to operate it, if not net zero plus, where energy production surpasses usage.

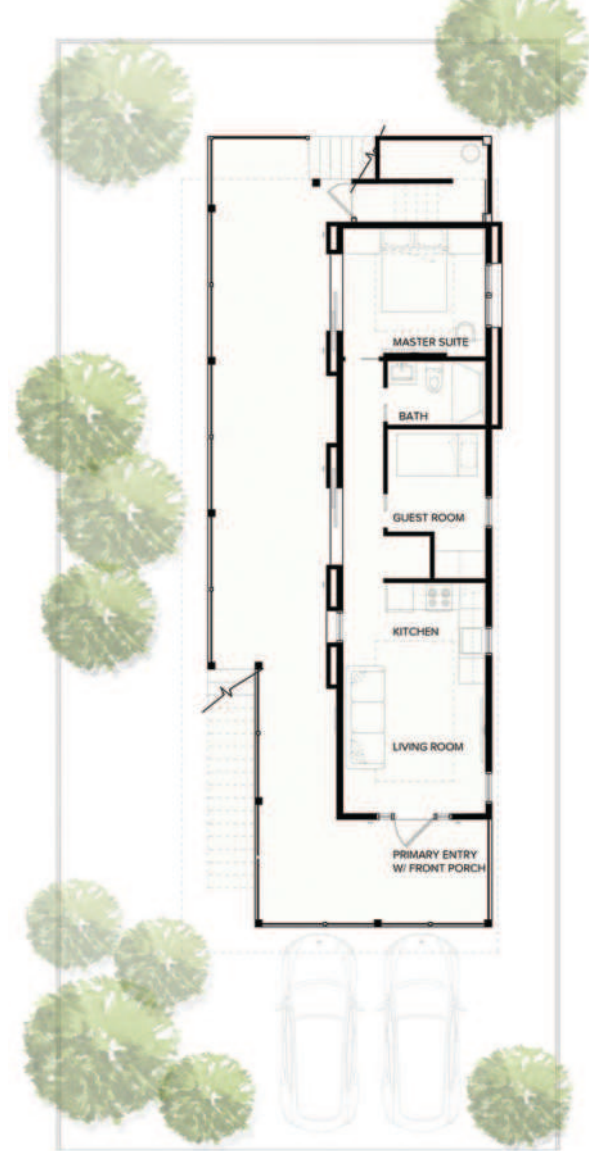
According to Pearl Homes Founder and President Marshall Gobuty, employees “ran it hard.” For example, they left the solar-powered lights on, ran the shower longer than needed, and used the dishwasher more often than necessary to

mimic the ways owners might act within their own homes.

Spending almost \$2 million on research was quite a gamble. “It was just an idea,” Gobuty remarked in a USGBC+ report in 2023. “But I had to prove that the home would perform before I said the words ‘net zero.’”

Once there was enough hard data to prove that the concept home was indeed net zero plus, Gobuty submitted the home for LEED consideration. The rest is history.

In 2021, the concept home was donated to the Boys & Girls Clubs of Manatee County for a fundraiser auction. “If our investment in developing the next generation of housing for Manatee County’s residents can help further the Boys & Girls



Small wonder. At 540 square feet, the two-bedroom, one-bath concept home ended up being net zero plus, meaning it generated more energy than it used.

Clubs’ mission to mentor, guide and support the youth in our community, then it’s well worth it,” Gobuty noted.

CHARGING AHEAD

Fast-forward to 2024. Pearl Homes has become Florida’s most successful and most honored sustainable homes developer. The company is a multi-time awards recipient, such as from USGBC, NAHB, and Fast Company—which includes “World’s Most Innovative Companies” in 2024—and it is the Grand Winner of **Green Builder Media’s 2025 Home of the Year** competition. Gobuty has been named as “Power Builder of the Year” multiple times by the U.S. Green Building Council and “LEED Visionary of the Year,” among other accolades.



Washroom appeal. Energy efficient amenities such as a smart toilet and shower and WaterSense fixtures helped keep water usage to a minimum.

CREDIT: COURTESY OF PEARL HOMES



Low-carbon cooking. Energy Star-rated appliances made meal preparation in the concept home easy and money saving. CREDIT: COURTESY OF PEARL HOMES



Screen gems. Smart televisions throughout the house made entertainment and communication an ongoing event. CREDIT: COURTESY OF PEARL HOMES



Storage success. A big part of the Pearl Concept Home's money-saving success stems from its association with battery storage system maker sonnen, which supplied an intelligent resident energy management unit similar to the one pictured here. CREDIT: SONNEN

After the concept home's successful demo, Pearl Homes in 2022 went ahead with its all-LEED Zero Energy project, [Hunter's Point Resort & Marina](#) in Cortez, Florida. It has since become the world's first LEED Zero Energy certified residential development, and it functions completely off-grid from the state's electric power. Aside from ensuring that resident utility bills are ultra low—a Hunter's Point homeowner saves about \$1,800 per year, for example—the community also has enough excess solar energy to run for up to two weeks in the event of persistent bad weather, according to Gobuty.

Given the number of hurricanes and other violent storms to hit Florida each year—resulting in 50-100 multi-day power

outages, according to the Florida Power Outage Tracker—an independent grid sounds very worthwhile, USGBC notes.

On top of that, the houses generate 35 percent more power and consume 25 percent less energy than Pearl Homes initially aimed for. This is in part due to features such as Energy Star-certified appliances, six inches of foam insulation throughout the walls, and dual-pane windows.

The project's overall Home Energy Rating System (HERS) Index rating is minus 13—a light year below the typical score of 80 for a new home built to code. And, overall carbon emissions are declining by 8 tons per year.

Gobuty hopes that other builders will use Pearl Homes' success as an example of what can be done when a real emphasis is placed on sustainability. His vision of the future includes communities that “work together in harmony with nature and technology to create sustainable living for all people.” That effort means focusing on sustainable materials and practices that ensure a future for the next generation.

“We like to think of it as ‘generational sustainability,’ because without a healthy planet, generational wealth is useless,” Gobuty says. “We plan to grow with the technological advancements as they improve, and continue to build upon the betterment of the way people live and communicate within their community.”



Superior purpose. In addition to providing year-round pleasant temperatures and humidity levels, constant fresh airflow, and lower electric bills for residents, OASYS helps builders meet ever-rising demand for healthier and higher-performance homes.

CREDIT: PANASONIC CORP

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**Honorable
Mention**

Welcome to the *OASYS*

Panasonic's new-world environmental control unit promises a more-efficient, less-expensive way to keep indoor air clean and cool.

BY ALAN NADITZ

Anyone who lives or builds houses in a hot environment—think Phoenix or Las Vegas at 1 p.m. in August—knows the limitations of the traditional air conditioning system. There can be problems with uneven airflow, temperature variations, and transfer fan noise level. And let's not forget about those triple-digit electric bills.

Panasonic Corporation has unveiled the **OASYS Residential Central Air Conditioning System**, a first-of-its-kind device that combines a mini split A/C, energy recovery ventilator (ERV), and DC motor-driven transfer fans to achieve a roughly 53 percent energy savings compared to conventional systems.

According to a release from the company, OASYS utilizes multiple DC motor-driven transfer fans to help ensure uniform airflow and minimize temperature differences across rooms. It also incorporates advanced air purification to enhance indoor air quality, reduces condensation risks, and mitigates mold growth in underfloor and attic spaces.

Americans spend about 90 percent of their time indoors, where the concentration of some pollutants is often two to five times higher than typical outdoor air. Improving ventilation with outdoor air is one of the fundamental strategies to lowering concentrations of indoor air pollutants—but most home heating and cooling systems do not mechanically bring fresh air into the house, according to the U.S. Energy Information Administration (EIA).

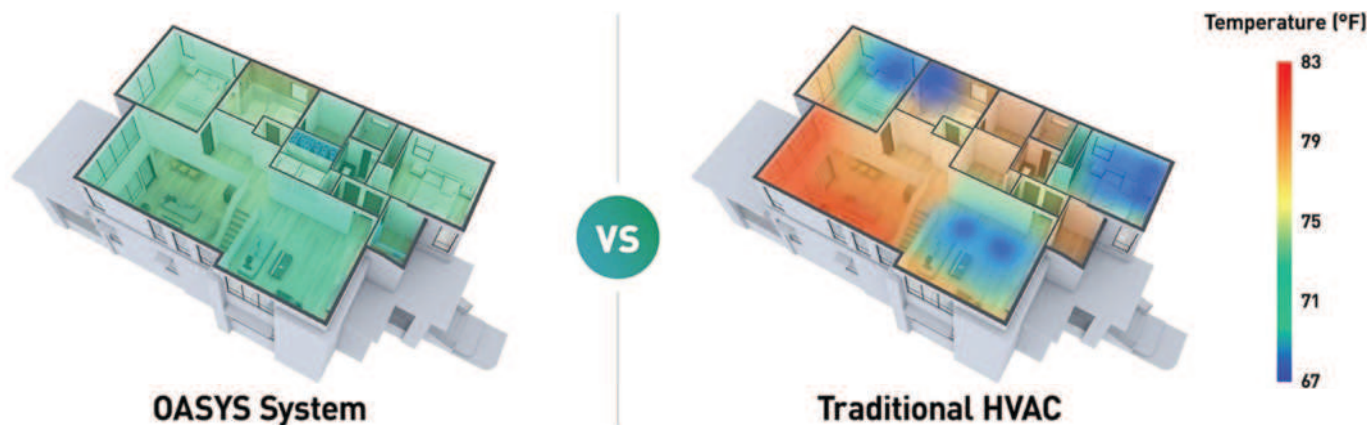
The release of OASYS coincides with increasing demand for energy efficient solutions to replace gas heating systems in the U.S. It meets the rising expectations for decarbonization and energy-saving technologies.

The average price of electricity to residential customers has increased more than 21 percent since 2020. A more energy-efficient whole home air quality management system, such as OASYS, can help protect homeowners from the impacts of rising energy costs, the U.S. Environmental Protection Administration (EPA) notes.

“OASYS is more than an HVAC system. It's a holistic air quality management solution to support your family's comfort and peace-of-mind by delivering cleaner air and consistent temperatures throughout the whole house,” states Naoki Kamo, president of Panasonic Eco Systems of North America. “Homes are where our families flourish. Panasonic has a 100-year history of inventing technologies to support the wellbeing and sustainability of people and society.”

Designed for highly airtight and insulated homes, the OASYS system enhances home durability. Its air circulation minimizes temperature-induced wear on wooden structures and simplifies maintenance by allowing partial component replacements instead of entire system overhauls.

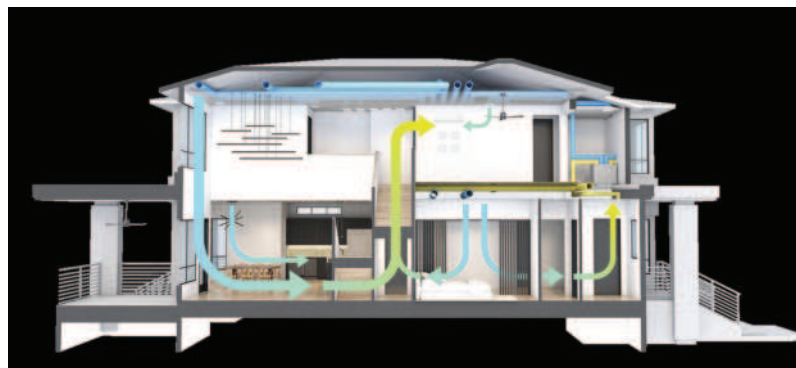
Panasonic plans to integrate OASYS with other energy saving technologies, further optimizing home energy management and advancing its commitment to sustainable innovation in the HVAC industry, the company notes.



New vs. old. The OASYS system (left) has a centralized mechanical room (in blue) that works in conjunction with **Swidget sensors** to ensure proper airflow and environmental control. Meanwhile, traditional HVAC (right) has rooms with varying temperatures throughout the house. CREDIT: PANASONIC CORP.



Perfect pieces. Panasonic's new central air conditioning system includes a mini split A/C, Energy Recovery Ventilator (ERV) and transfer fans that use DC power. CREDIT: PANASONIC CORP.



Airflow action. The OASYS system takes in fresh outdoor air, filters it, and tempers it to the homeowner's temperature setting. It then circulates air for approximately four air changes per hour while continuously monitoring the air for comfort. CREDIT: PANASONIC CORP.



TODAY'S HOMEOWNER

A QUESTION OF COST

Balancing act. The cost of installing green energy-related products such as solar panels, a battery storage unit and triple-pane windows can be offset by the resulting reductions in homeowner's insurance and utility bills. CREDIT: ISTOCK/IMAGINIMA

Energy efficient improvements and stronger home features can lower operating expenses for homeowners.

BY MICHELE LERNER

When one of Don Worthington's neighbors nearly lost her home because of the pressure financing her solar panels put on her budget, her situation sparked more than sympathy. Worthington, division president of Primary Residential Mortgage and [Lowtility](#) in Layton, Utah, looked for a solution that combined renewable energy financing and utility costs into a mortgage approval equation.

"Instead of just looking at the amount borrowed, the rate and the loan payments, lenders should be looking at the cost to live somewhere to determine affordability," Worthington says. "If you have a monthly \$3,000 budget all-in for your housing costs, then we should reverse engineer that with your utility costs, renewable energy financing and home insurance payments and figure out your borrowing ability from there."

When property taxes, utility bills and homeowner insurance premiums increase, every homeowner is hit regardless of whether

they are first-time buyers or have owned their house for decades. Government and nonprofit groups can provide down payment and closing cost assistance to buyers to help them manage the upfront impediments to buying a home. But consumers today also recognize that the long-term operating costs of homeownership are a better measure of affordability than the initial cost to buy.

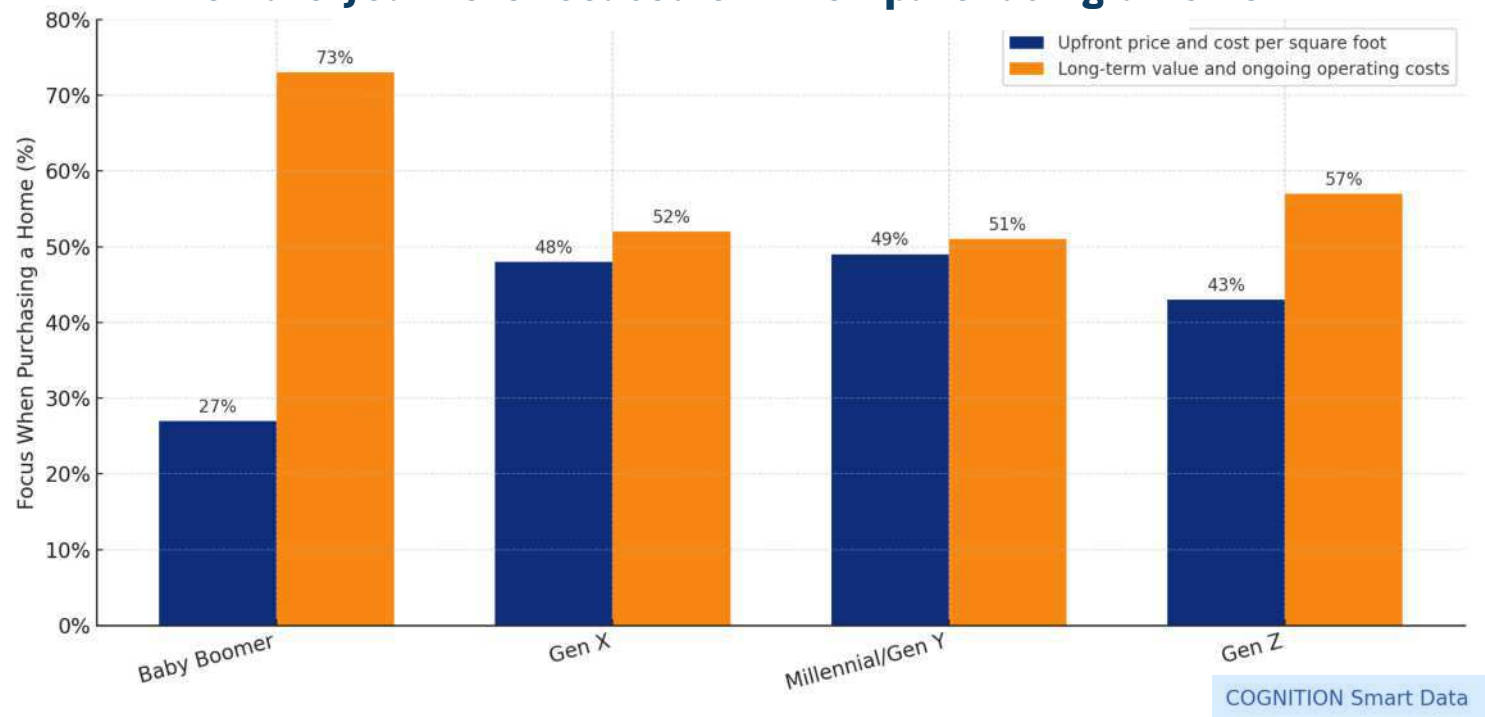
Those costs include mortgage principal and interest, property taxes, homeowner's insurance and, for buyers who make a down payment of less than 20 percent, private mortgage insurance (PMI). Other costs include utility bills, maintenance and repairs. In addition, many homeowners pay homeowner association dues. During the first quarter of 2025, the average list price for a home was \$413,700, according to [NerdWallet](#), a personal finance site. With a down payment of 9 percent, which was the average for first-time homebuyers last year, buyers would pay approximately \$3,240 annually for their mortgage, insurance, property taxes and PMI.

But homebuyers who purchase a new energy-efficient home or

invest in retrofits that improve a house’s resilience to damage from natural disasters and power outages may be able to lower costs such as utility bills and homeowner’s insurance premiums.

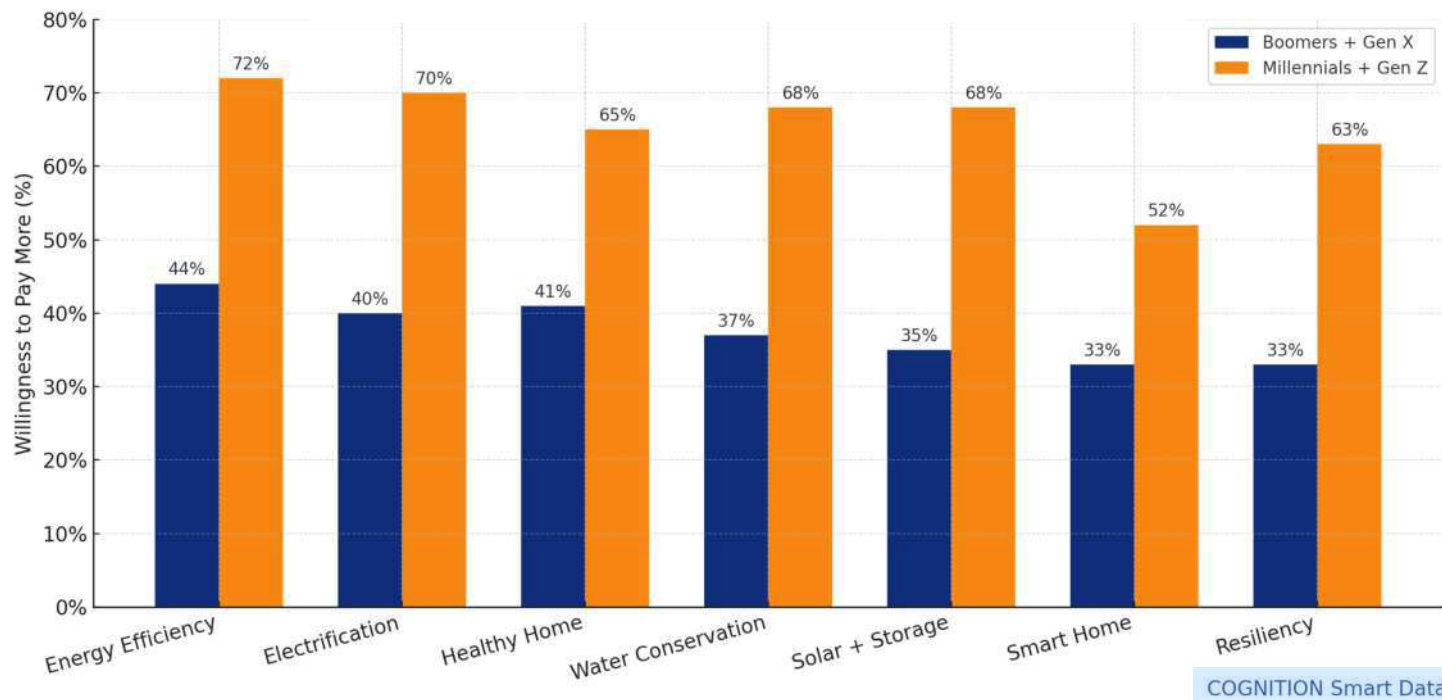
A recent Green Builder Media COGNITION Smart Data survey found that across all generations, homebuyers are now more focused on long-term operating costs than they are on upfront cost to buy a home.

Which are you more focused on when purchasing a home?



COGNITION Smart Data surveys also found that buyers were willing to invest upfront in multiple features to improve their homes in ways that would generate long-term savings and resilience. The top four features that buyers would pay more for include energy efficiency, electrification, water conservation, and solar power and storage.

Willingness to Pay More Upfront for Sustainability Upgrades





Power pact. ENERGY STAR-certified appliances can help overcome higher utility bills. Even a small increase—3 percent—can still greatly impact a household's budget.

CREDIT: ISTOCK/ANDRESR

Builders, lenders and organizations that provide certifications for homeowners and industry professionals are investing in measures that match the desire for sustainability and resilience to financial advantages.

RENEWABLE ENERGY FINANCING, LONG-TERM BENEFITS

Worthington sees renewable energy as a solution that benefits homeowners, their communities and even the banking industry.

“Mortgage servicing companies need to get their borrowers to make on-time payments,” Worthington says. “This is where energy bills intersect with the mortgage industry, because homes with energy-efficient features, solar power and storage, and lower utility bills tend to have better loan performance.”

When utility bills increased by a mere 3 percent, lenders and homeowners often ignored the impact of that increase on

homeowner's budgets, Worthington says. But now that rates are up 18 percent to 35 percent annually, the impact is more visible.

Typically, homeowners get their power through their local utility company or lease solar equipment through a finance company, Worthington says.

“They'll put a lien on your house, and they have to approve a new borrower if you want to sell the house,” he says. “We lend borrowers money to add solar to their homes as part of their mortgage instead of leasing them. The mortgage payment is a little higher to include the solar costs, but their utility bills will be reduced to balance that out.”

For example, the monthly mortgage payment may go up \$100 to cover the solar installation, but the utility bill could drop from \$300 to \$100 per month for an overall savings of \$200. Reducing a monthly utility bill by that amount allows homebuyers or refinancing homeowners to increase their borrowing power by \$40,000 to \$50,000, Worthington says.



Aside from solar panels and storage, the Lowtility loan program can be used for other energy efficiency improvements, such as a new HVAC system, insulation, ENERGY STAR appliances or geothermal heating systems.

“We’re one of a handful of lenders to include utility costs and the impact of upgrades in our loan underwriting, but we hope others will start to adapt our approach,” Worthington says. “From a long-term usage perspective, these improvements reduce the cost of ownership and make housing more affordable.”

Another facet of renewable energy financing that needs improvement is the home appraisal process, Worthington says.

“In August 2024, Fannie Mae and Freddie Mac changed the guidelines so that only solar panels that are owned—not leased—can be considered in the



“Appraisers and agents don’t always understand the value of solar power and batteries or other energy efficient features. The value should be based on lower energy bills.”

—Don Worthington, Division President
Primary Residential Mortgage



value of the property,” Worthington says. “Appraisers and agents don’t always understand the value of solar power and batteries or other energy efficient features. The value should be based on lower energy bills.”

RESILIENCY ENTERS THE INSURANCE EQUATION

Insurance companies focus on risk assessments when determining whether they will insure a home, and the premiums they will charge.

“We’ve seen a dramatic change among insurance companies over the past 18 months or so,” says Marshall Gobuty, founder and president of [Pearl Homes](#), a sustainable home developer in Sarasota, Florida. “Some insurance companies used to say they wouldn’t cover solar systems because they might cause roof damage. But we clip our solar panels onto a standing seam roof. Our homes in Florida have been through four major hurricanes

now without losing a single solar panel. Insurance companies who understand this are offering lower rates.”

Today, owners of Pearl Homes pay just \$1,500 to \$1,700 in flood insurance and another \$4,500 for general homeowner’s insurance for a \$1.5 million home—a very low amount given Florida’s high-risk climate, Gobuty says.

Pearl Homes incorporates numerous resilient and sustainable features in their homes, such as taller footings and more fill to raise homes above the flood zone, additional insulation with 2-by-6 framing and spray foam throughout the floors and walls, and roof strapping that is three times the code requirement. The net zero homes have solar with battery storage, so homeowners kept their lights through back-to-back hurricanes in the fall of 2024.

“We’re getting a patent for the technology we use in our homes. Hopefully, we will see homes built this way across the entire country,” Gobuty says. “The infrastructure of a home is an



A rebuilding effort. A program like one from Global Network for Zero calls for an assessment of a building, and then provides an outline of how the structure can be improved.

CREDIT: ISTOCK/THANK YOU FOR YOUR ASSISTANT

important piece of this, especially in areas prone to floods where you need to raise the fill and garage, or areas with high winds where you need to provide extra strapping on the roof.”

Insurance companies need to be educated about these resilience features, he notes.

“In Florida, it’s pretty easy to see the black and white of what happens when you harden homes and elevate them, so insurance companies are more willing to give discounts to homeowners based on those features,” Gobuty says. “It’s the role of builders to demonstrate and explain to insurance companies what they’re doing and how their homes have performed during natural disasters to help them see the risk reduction benefits and lower costs for buyers.”





Good 'tide'ings. Resilient and sustainable features such as taller footings and more fill to raise homes above the flood zone—found in dwellings built by Pearl Homes—can reduce home and flood insurance costs. CREDIT: PEARL HOMES

In addition, Gobuty says that builders need to educate consumers, appraisers and lenders about the impact of resilient features, as well as the reduction in utility costs associated with homes with a lower HERS rating.

CERTIFICATION TO SIMPLIFY DATA COLLECTION

While builders have an array of green certifications and ratings systems such as HERS and Energy Star to prove to insurance companies, lenders and appraisers about the existence and value of sustainable and resilient features, until recently it was harder for homeowners to access data and details on retrofits.

“When we first started, Pearl was focused on the problem that people were making considerable investments in their house, for efficiency, for renewables, and potentially for resilience, and they weren’t seeing any benefit from that in the form of an increased equity value,” says Cynthia Adams, CEO and co-founder of Pearl, a home performance rating organization. “The reason was that most of the things that they were doing were kind of invisible. It wasn’t about aesthetics such as granite counters

as much as it was about performance and durability.”

Pearl’s first product was a certification system with a score that focused on energy efficiency and solar power. Now, Pearl’s score considers wellness, with the acronym SCORE for safety, comfort, operations, resilience and energy.

“Our SCORE is applicable for existing homes and new construction,” Adams says. “If you score above a certain amount, we can document the features that you have in your home and you can earn a certification. We want to embed the Pearl SCORE into the resale transaction to provide greater transparency for buyers.”

SCORE can serve as a blueprint for home improvement, to help buyers make cost effective improvements that benefit their family’s quality of life in multiple dimensions. Pearl is developing a database of 88 million homes for a robust system to check on the improvements of existing homes.

“We also have an app that consumers can interact with and upload photos and documents that verify their improvements and update their score,” Adams says. “This keeps homeowners in control and eliminates



“Everybody wants to do green. We just need to show them they can save money. We need to show them the green.”

**—Mahesh Ramanujam,
CEO and Co-Founder
Global Network for Zero**

RETROFITTING FOR RESILIENCE AND AFFORDABILITY

The [National Institute of Building Sciences](#) estimates that every \$1 invested in private sector building mitigation retrofits could reduce the cost of future losses by \$4. But homeowners who make improvements for resiliency and sustainability don't always see the return on their investment in appraised value and insurance discounts. The [Global Network for Zero](#) generated a certification for residential buildings that applies to existing homes.

“There's been a big focus on new construction and commercial buildings in terms of getting to net zero, but the lack of initial focus on existing residential buildings was a missed opportunity,” says Mahesh Ramanujam, CEO and co-founder of Global Network for Zero, and former president and CEO of the U.S. Green Building Council. “We're highly focused now on net zero energy, net zero emissions, net zero water and net zero waste for existing homes.”

The Global Network for Zero's program starts with an assessment of a building and outlines a plan of how a building can be improved.

“It's like looking at a credit report and coming up with a two-to-five-year improvement plan,” Ramanujam says. “Then, we want to make sure that people get credit for whatever progress they make.”

Since lenders often own 80 percent of a home, Ramanujam believes they should offer incentives for homeowners to make progress towards achieving net zero.

“Lenders could offer a reduction in interest rates to compensate for the upfront costs of retrofits,” Ramanujam says. “Insurance companies could offer discounts, and I think governments could offer property tax breaks to homeowners who have invested in retrofits since everyone benefits from them.

“Everybody wants to do green,” Ramanujam adds. “We just need to show them they can all save money. We need to show them the green.” **GB**

the need to hire a separate contractor to verify their improvements.”

Homeowners can issue a home performance report with features, model numbers and performance characteristics that can be given to an appraiser to demonstrate contributions to home values, Adams says.

“We've done studies that show a 3 to 5.5 percent price premium for high performance homes,” Adams says.

Adams hopes that Pearl's registry and Pearl SCOREs will eventually be used by insurance companies to document reduced claims on homes that have resilient improvements.

“They already recognize the value of leak detectors and provide discounts, so we expect them to see the importance of de-risking homes in other ways,” Adams says. “Homeowners can document steps they take such as adding gutter guards that stop debris that could cause other damage, for example. On the flip side, insurance companies can also penalize homeowners with higher rates who don't take steps to mitigate risk.”



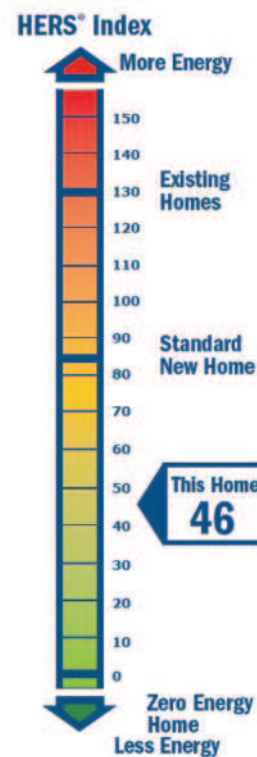
PHOTOS COURTESY OF INSIGHT HOMES

Still a winner. Insight Homes won a third Housing Innovation Grand Award from the U.S. Department of Energy (DOE) for its *Peterman II* home model thanks to its zero energy-ready nature. This includes a conduit in place for future installation of solar panels, an airtight building envelope, energy efficient appliances, and more.

Project Info

PROJECT NAME: The Peterman II, Lewes, Delaware

BUILDER: **Insight Homes**, Bridgeville, Delaware



Raising the Bar

CONTENT COURTESY OF
THE U.S. DEPARTMENT OF ENERGY
EDITED BY GREEN BUILDER STAFF

An environmentally friendly design helps Insight Homes' Peterman II home take energy efficiency to a new level.

Editor's note: Each year, the U.S. Department of Energy (DOE)'s Office of Energy Efficiency & Renewable Energy honors the best of its Zero Energy Ready Homes (ZERHs). The winners are announced every fall. Here's a preview of what's coming in the next issue of Green Builder, featuring a finalist from DOE's previous roster of award honorees.

Not many builders are confident enough in the energy efficiency of their homes to post their homeowners' utility bills on their websites, but Insight Homes of Bridgeville, Delaware, has made a habit of it.

Insight's *Peterman II* model has landed the company's third Housing Innovation Grand Award from the U.S. Department of Energy (DOE). The award goes to the builder that constructs the most homes in a year that are certified to DOE's Zero Energy Ready Home (ZERH) criteria. Insight Homes constructs about 200 homes a year and is committed to building all of its homes to the requirements of DOE's ZERH program. It has certified more than 1,000 homes to the program so far.

"We ask homeowners to share their utility bills with us as testimonials to the actual performance observed in their homes. The utility bills are posted on Insight Home's website for prospective buyers to review," says Kevin Brozyna, Insight Homes' vice president of operations. "Insight started building new homes in southern Delaware with the vision of making a better product and we've spent years perfecting the process. Today, our homes are the healthiest and most energy-efficient homes in the Mid-Atlantic."

Building to the requirements of the DOE program has helped Insight meet its energy efficiency goals. Every DOE Zero Energy Ready-certified home meets the requirements of ENERGY STAR Certified Homes. They must also be certified to the U.S. Environmental Protection Agency (EPA)'s Indoor AirPlus criteria and meet the hot

water distribution requirements of the EPA's WaterSense program.

DOE Zero Energy Ready homes must also meet IECC 2015 insulation requirements, be blower door tested for whole house air leakage, comply with moisture management guidelines, have ducts inside conditioned space, and use Energy Star-labeled windows, lighting, and appliances. Homes must also have solar electric panels installed or have the conduit and electrical panel space in place for future installation of solar panels.

Insight also received a Housing Innovation Award for its *Peterman II* home model in the Production Home category. The home is zero energy ready, with conduit in place for future installation of the solar panels. Even without the photovoltaics, homeowners who purchase Insight's *Peterman II* model can expect energy cost savings of more than \$4,500 per year, or more than \$220,000 in the first 30 years, compared to a home just built to code.

PANEL PROCEDURES

Insight Homes utilizes an integrated design process when developing the plans for a new house model. Through this process, the designers meet with key trade partners, including the HVAC, structural, framing, and plumbing trades to get input to ensure high performance targets can be met in a functional and buildable design.

Insight Homes employs a panelized wall system consisting of 2-by-6 framing at 24-inch on-center stud spacing and other advanced framing techniques to reduce wood and increase insulation in the walls such as

insulated headers, reduced framing around windows, and two- and three-stud corners with studs positioned to allow insulation into the corners.

Every panel is made in a climate-controlled indoor environment where materials are protected from the elements. They are precision cut and attached with laser-guided pneumatic nailers and self-squaring roller tables to enable every panel to be constructed with an accuracy within 1/16th of an inch. The wall panels have a 7/16-inch coated OSB exterior sheathing. This product saves time and money by serving as the structural sheathing and the primary weather barrier when all seams between panels are taped. The wall cavities are insulated with R-23 of netted and blown fiberglass. No plumbing or HVAC is installed in the exterior walls. The walls are clad with vinyl siding.

BELOW AND ABOVE

The home also has a finished basement. The poured concrete walls are protected on the exterior with a liquid-applied water proofing and dimple board drainage membrane that extends from grade down to the footing drain. An interior perimeter drain is installed and connected to a sump pit. The foundation slab sits on 4 inches of clean gravel for a capillary break and is covered with a polyethylene vapor barrier. In the finished areas of the basement, the walls are insulated with R-15 spray polyurethane foam applied to the inside of the foundation walls within the frame stud bays. In the unfinished areas of the basement, 2 inches (R-10) of foil-faced

Annual Energy
Costs

\$3,160
(without PV)

Annual Energy
Cost Savings*

\$4,539
(without PV)

* vs typical new homes

Annual Energy
Savings

10,228 kWh
(without PV)

Savings in the first
30 years

\$221,269
(without PV)

Key Features

AIR SEALING: 1.9 ACH50. Canned foam seals all top plates and holes in walls, attic, subfloor.

APPLIANCES: ENERGY STAR refrigerator, dishwasher, and water heater.

ATTIC: Vented attic: R-49 total: 16.25-inch blown fiberglass, R-38 fiberglass batts in vaulted ceilings. Attic hatches gasketed and insulated with XPS.

ENERGY MANAGEMENT SYSTEM: Wi-Fi-enabled thermostat.

FOUNDATION: Finished basement: Poured concrete walls with R-15 SPF in finished areas and R-10 poly-iso in unfinished areas, R-19 open-cell in band joist.

HOT WATER: Propane condensing tankless water heater, 0.97 EF.

HVAC: Gas furnace, 97.5 AFUE. Central air-source heat pump, 10 HSPF, 20 SEER.

LIGHTING: 100 percent LED.

ROOF: Truss gabled roof: 7/16-inch OSB sheathing, 15# felt, self-adhered membrane in valleys; composite shingles, doubled at rakes; ridge and soffit vents; 15-inch overhangs.

SOLAR: No PV.

UNDERSLAB: 4-inch gravel with vapor barrier, perimeter drainage tile and sump pump.

VENTILATION: Exhaust-only ventilation, MERV 13 filters.

WALLS: Panelized, 2-by-6 at 24-inch on center (OC), R-23 total: advanced-framed, R-23 netted blown fiberglass, 7/16-inch coated OSB taped, vinyl siding. No plumbing or HVAC in exterior walls.

WATER CONSERVATION: EPA WaterSense fixtures, Central manifold with PEX piping and homerun distribution.

WINDOWS: Double-pane, argon-filled, VINYL FRAME, DOUBLE-HUNG, U=0.28, SHGC=0.19.

OTHER: National Green Building Standard Gold level home. Panelized wall construction.

True to size. High-performance windows, 6-inch exterior walls, and larger overhangs significantly reduce the heating and cooling load for a home of this size.



polyisocyanurate rigid insulation is applied to the face of the poured concrete wall. The band joists are insulated with R-19 open-cell spray polyurethane foam.

The vented attic is constructed with engineered roof trusses that include an 18-inch raised heel design to allow for full depth insulation over the top plates of the exterior walls. Insulation baffles are installed in each attic bay to prevent wind washing from the soffit vents and to provide a path for attic ventilation air to flow from the eaves up to the ridge vent. In the mixed humid climate, this air flow helps to pull heat and humidity out of the attic in the summer and to prevent ice dams in the winter. The attic is insulated with 16.25 inches of loose blown fiberglass insulation to achieve an R-49 insulation value across the full ceiling plane. For any vaulted ceiling areas, R-38 fiberglass batts were used.

Attic hatches in side walls or the ceiling plane are insulated with multiple layers of extruded polystyrene rigid foam board and are gasketed for air sealing. No mechanical equipment or HVAC ductwork is permitted in the attic. All top plates along interior walls are sealed with canned foam, as are any penetrations for light fixtures, exhaust fans, plumbing stacks and more through the ceiling plane.

INDOOR ENVIRONMENTAL ISSUES

Every home certified through the DOE ZERH program is inspected by a HERS rater and

tested for air tightness. This Insight home achieved an air tightness of 1.9 air changes per hour at 50 Pascals (ACH50).

Air sealing occurred in two stages. The first stage occurred before drywall was installed and after mechanical rough-in when all penetrations through the subfloor to the crawlspace, through the top plates and chases to the attic. The exterior walls were sealed using expanding foam sealant. Rough openings around windows and door frames were sealed with low-expansion foam sealant. The second stage occurred after drywall was installed when spray foam was used to seal the back side of the ceiling drywall, along the top plates of all interior partition walls, and any penetrations through the ceiling drywall and partition walls (for light fixtures, exhaust fans, plumbing stacks, and more).

The home is heated and cooled with a dual-fuel system, including a central air source heat pump with a variable speed compressor and a propane furnace. The heat pump has a heating efficiency of 10.0 HSPF and a cooling efficiency of 20.0 SEER. The modulating gas (propane) furnace has a heating efficiency of 97.5 AFUE.

The mechanical equipment is in a conditioned control room in the basement. The duct system trunk lines are rigid, round sheet metal ducts while branch takeoffs are insulated flex ducts with a manual balancing damper at each branch. The MERV 13 air filter is located in a central return box placed



Up to code. The *Peterman II* home was built to meet the insulation and air sealing requirements of the U.S. Department of Energy (DOE)'s Zero Energy Ready Home (ZERH) program. It has highly efficient HVAC, water heating, lighting, windows and appliances.

in a wall of the living space to provide easy access for replacement. By locating the return register vertically in the wall, the accumulation of dust and debris that can occur with a floor register is avoided. All systems are equipped with a Wi-Fi-enabled thermostat. Ventilation is provided by exhaust fans in the bathrooms.

Given the longer shoulder seasons in the mixed-humid climate, space conditioning demands for sensible load may be minimal. Coupled with high-performance windows, 6-inch exterior walls, and larger overhangs, the heating and cooling load is significantly reduced for a home of this size. With the space conditioning system not calling for heating or cooling, the homes are designed to have the central air handler fan (with an ECM motor) run in manual mode at 30 percent fan capacity for a minimum of 45 minutes every hour.

Ceiling fans are installed in the central living spaces, including the living room, loft, morning room, and master bedroom. The periodic cycling of the air handler, coupled with the standard ceiling fans, can help to ensure mixing of the air throughout

the home and prevent stratification from occurring when there is no demand for heating and cooling.

MORE POWER AND AIR IMPROVEMENTS

All of the home's lighting fixtures use LED light sources. The home's refrigerator, dishwasher, and tankless water heater are all Energy Star rated. The home's plumbing system consists of a central manifold with PEX piping. The homerun distribution system supply lines are sized for each specific end use and shut-off valves are installed at each point of use. The fixtures are EPA WaterSense-labeled.

All homes certified through the DOE ZERH program must meet the requirements of EPA Indoor AirPlus. Insight Homes uses low-VOC paints, construction adhesives, carpeting, and other materials that allow the home to achieve the gold level of certification under the National Green Building Standard.

In addition to meeting the DOE ZERH designation, which includes Energy Star and Indoor AirPlus certification, Insight Homes has also committed to building all its homes to be certified to the National Green

Building Standard. These performance programs require third-party inspections, as well as performance testing at several stages of construction to ensure compliance with strict guidelines. In addition, Insight Homes' HVAC suppliers require system commissioning and air flow testing prior to occupancy.

"Insight's entire business model evolved around home performance, efficiency, and a healthy indoor environment," says Brozyna. "Because we made the decision to make these high-performance features standard on all the homes we build, we are able to negotiate better pricing from vendors on higher performing products."

Savings are achieved by placing large-volume orders rather than purchasing them as individual upgrades. This allows Insight to incorporate better equipment in all of its homes more cost effectively, Brozyna adds. "Insight Homes was started with the vision to be better and do better for home buyers," he says. "When our customers are still amazed, 5 years after moving in, at how low their energy bills are, we know we are living up to our motto: 'It's just a better house.'" **GB**

HOUSING 2.0

A TALE OF TWO CITIES

The link between housing affordability and sustainability.

BY SAM RASHKIN

This is Sam Rashkin's latest in a series of articles based on his second book, "Housing 2.0: A Disruption Survival Guide." It is intended as a roadmap for high-performance builders to become the most successful in the industry.

It should not be a news flash to anyone that the nation is suffering an epic housing affordability crisis. However, a lack of urgent action at all levels of government and industry suggests the severity of this crisis is not being taken seriously enough.

Meanwhile, housing is rapidly approaching a breaking point that will inevitably disrupt our entire economy. Consider [recent analysis results](#) indicating median income households can afford to purchase homes in only two of the 50 largest metro areas in the U.S. One of these two markets is Pittsburgh, Pennsylvania, where the median house price is \$275,000. At the other end of the affordability spectrum is Los Angeles, where the median home price exceeds \$1 million. Yet, both markets have very similar median household incomes of nearly \$80,000. In other words, housing in Pittsburgh is about four times more affordable than in Los Angeles.

However, Americans are becoming increasingly house poor, even in the most affordable housing markets. This article will examine why this is the case and the implications it has for the sustainable housing movement, and introduce Housing 2.0 fundamentals as a key path to attainable homes that live better.

THE DISCONNECT BETWEEN MEDIAN PRICE HOMES AND MEDIAN HOUSEHOLD INCOME

Housing is the ultimate consumer product. Nothing comes close relative to cost, complexity, emotion and impact on our lives. Common sense suggests the customer must be able to afford to purchase a product in order for the business making that product to be viable. Yet, the industry has experienced an exponentially increasing cost curve over the past 40 years (see Figure 1).

Now we're at a point where the ratio of median house price to median household income exceeds 5.0, a threshold considered "severely financially burdened." A healthy housing market that is attainable to its customers would have a ratio of 3.0 and under.

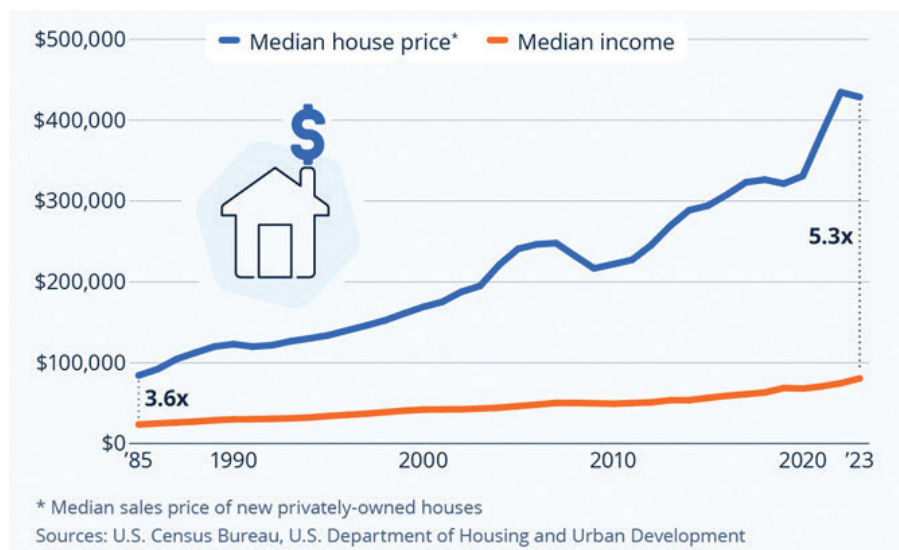


Figure 1: Median house price and median household income in the U.S.

SOURCE: STATISTA

HOUSING AFFORDABILITY BY THE NUMBERS

The housing affordability crisis is even more severe than it appears, based on the price disconnect with household income. There are two reasons.

First, mortgage interest rates are currently hovering near 7 percent, further exacerbating the financial burden of high sticker prices.

Second, the price to income ratio alone does not account for a wide array of other homeownership costs, which have also increased far above the inflation rate. According to a recent survey, a typical American homeowner spends more than \$18,000 on non-mortgage home expenses every year. These expenses include:

- Private mortgage insurance, required if the homeowner provides less than a 20 percent down payment. This is increasingly out of reach due to inflated home prices.
- An “opportunity cost” of a downpayment or rent deposit that could be applied to other investments.
- Rapidly increasing property taxes, on the way up as cities struggle to manage inflated operations costs.
- The cost of home insurance (if you can get it), inflated especially in high disaster risk locations.
- Home maintenance costs, including repairs, upgrades and routine services.
- Utility costs for electricity, gas, water, sewer, and trash removal.

To better understand the full housing financial burden, all of these costs were researched and tabulated for owning and renting a median price single-family home in our two cities, Los Angeles (see Table 1) and Pittsburgh (see Table 2). The key data sources and assumptions are noted in the first column of the tables.

Housing Expenses for Los Angeles Median Price Home: \$1,072,000	Homeownership Monthly Cost	Home Renting Monthly Cost
Downpayment Opportunity Cost [TradeThatSwing]	\$1,493	\$63
Mortgage [BankRate] or Rent [Zillow]	\$6,374	\$4,500
Mortgage Interest Tax Deduction [12% Tax Bracket]	(\$700)	\$0
Property Taxes [BankRate]	\$706	\$0
Primary Mortgage Insurance [OMNI calculator]	\$1,407	\$0
Home Insurance Premium [BankRate]	\$135	\$25
Utility Cost [UtilitySmarts]	\$407	\$192
Maintenance Cost [Compass]	\$2,200	\$30
TOTAL Monthly Cost	\$10,722	\$4,810
TOTAL Annual Cost	\$128,664	\$57,720
TOTAL 10-Year Cost	\$1,266,640	\$577,200
TOTAL Downpayment	\$107,200	\$4,500

Table 1: Complete cost assessment for median price home in Los Angeles.

Housing Expenses for Pittsburgh Median Price Home: \$275,000	Homeownership Monthly Cost	Home Renting Monthly Cost
Downpayment Opportunity Cost [TradeThatSwing]	\$355	\$31
Mortgage [BankRate] or Rent [Zillow]	\$525	\$2,200
Mortgage Interest Tax Deduction [12% Tax Bracket]	(\$63)	\$0
Property Taxes [BankRate]	168	\$0
Primary Mortgage Insurance [OMNI calculator]	\$334	\$0
Home Insurance Premium [BankRate]	\$66	\$25
Utility Cost [UtilitySmarts]	\$313	\$182
Maintenance Cost [2% of cost]	\$600	\$30
TOTAL Monthly Cost	\$2,298	\$2,468
TOTAL Annual Cost	\$27,576	\$29,616
TOTAL 10-Year Cost	\$275,760	\$296,160
TOTAL Downpayment	\$25,462	\$2,200

Table 2: Complete cost assessment for median price home in Pittsburgh, PA

The results in these tables are disturbing. In Los Angeles, the total annual home ownership cost is nearly \$130,000, which is nearly double the median household pre-tax income. The cost in Pittsburgh, \$27,500, is much better but still at the cusp of affordability, representing about one-third the median household pre-tax income. The results also show that renting is cheaper than owning in Los Angeles but higher than owning in Pittsburgh, and in both cases imposes too high a financial burden. The total annual cost of renting a single-family home in Los Angeles, approximately \$57,000, represents over 70 percent of the median household pre-tax income. The cost in Pittsburgh, \$30,000, accounts for nearly 40 percent of household pre-tax income.

Renters can increase affordability by renting apartments rather than single-family homes, but these costs are also increasing significantly. A reasonable conclusion is that the high cost of housing, whether ownership or renting, is making Americans house poor. Key economic indicators bear this out, including:

- Nearly two-thirds of Americans [living paycheck to paycheck](#)
- Delinquency rates on auto loans [rising substantially to above pre-pandemic levels](#)
- Credit card balances [exceeding \\$1.2 trillion](#) by the end of 2024

High housing costs make renting more attractive than buying in expensive markets. This will be especially true as buyers observe significant decreases in home appreciation, and even depreciation

already occurring in some markets, as housing prices push up against affordability limits. This is significant, because home appreciation is often a primary justification for the higher cost of homeownership. Recent data suggests this shift may already be happening: Renting has surged by at least [5 percentage points](#) in 11 out of 20 suburbs surrounding the largest U.S. metro areas.

WHAT THE HOUSING AFFORDABILITY CRISIS MEANS TO THE SUSTAINABILITY MOVEMENT

The substantial increase in housing costs winds up shrinking the impact of increasing energy efficiency goals for sustainable housing. Saving \$40 or \$60 per month on utility bills doesn't make a dent in monthly ownership cost, whether \$12,000 in Los Angeles or \$5,000 in Pittsburgh. Thus, the sustainability movement will need to pivot from emphasizing energy savings to more-compelling value propositions such as:

- Enhanced wellness
- Ensured comfort
- Superior quality
- Reduced obsolescence
- Greater disaster protection
- Higher future value

A deeper dive into opportunities to integrate and translate this value will be provided in future articles. However, the more critical impact

Sides of a coin. Home ownership prices are substantially different in Los Angeles and Pittsburgh, but affordability—or lack of it—is still an issue in both cities. CREDIT: COURTESY OF MARONDA HOMES



is that sustainability is not enough in this new paradigm. Not nearly enough. It is critical that all housing professionals engaged in mainstream housing apply six strategies for minimizing the cost of housing:

OPTIMIZE:

- **Lean**—by minimizing waste in community planning, design and construction
- **Simple**—by minimizing complexity in design and construction that does not add value
- **Systems integration**—by ensuring all key home elements are part of the design process
- **Quality**—by minimizing errors in processes and exploiting proven innovations
- **Choice**—by using mass-customization with expertly curated but limited options
- **Productivity**—by leveraging systems-built solutions that are faster, better and lower cost

It takes more than 400 pages in my book, "Housing 2.0: A Disruption Survival Guide," to cover the fundamentals required to apply these optimization strategies. They are all critical to ensure sustainable communities and homes also lead the industry in user experience and value.

In addition to using the book as a reference, please join me as we continue to address these fundamentals in future Housing 2.0 articles, seminars and workshops. Let's join forces in urgently ensuring financial wellness and sustainability for mainstream homebuyers. **GB**

*Sam Rashkin's two-decade career as a licensed architect includes serving on national steering committees for the U.S. Green Building Council (USGBC)'s LEED for Homes, Green Builder Media's Green Builder Guidelines, the Environmental Protection Agency (EPA)'s WaterSense label, and EPA's Indoor airPLUS label. He has partnered with Green Builder Media to develop the **Housing 2.0 program**, which empowers building professionals to design and construct higher-performance, healthier and more-sustainable homes at a fraction of the cost.*

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The cash alternative. A credit card is a great alternative to a contracting or purchase order process, which can otherwise be long-winded for construction companies.

CREDIT: ISTOCK/PAKIN JARERNDÉE

Paying With Plastic

Here's how to use credit cards to optimize construction spending in the field.

In the construction industry, decision making is driven by the needs of the field. When it comes to purchasing power, employees are often reliant on credit cards of various types. If a field worker often has to purchase from Home Depot, it makes sense that they would get a Home Depot card. Many also get a T&E card. And a fuel card. And maybe a multi-purpose corporate card. Some workers may even charge company spending to their personal card and submit an invoice for reimbursement.

Paying with a credit card is the fastest and most efficient way for field workers to meet immediate needs. It is a great alternative to a contracting or purchase order process, which would slow the job down.

In reality, what happens on the back end is anything but fast and efficient. The accounts payable team ends up running a whole bunch of disjointed, semi-manual processes. That creates

challenges around data accuracy, visibility, and control. It can also result in delays in reporting and job costing. That, in turn, leads to delays in billing clients and challenges with cost control.

Today's fintechs (a.k.a., financial technologies) offer clients streamlined, standardized, automated solutions that make the front and back-end processes around credit card spending much more efficient. They let accounts payable and finance teams enable field spending without creating a tangled mess for themselves to manage.

TODAY'S CLUNKY PAYMENTS

What typically happens now is that cards are issued upon request to meet different needs. Accounts payable teams end up managing four or five card programs. They have to track down all the receipts for each—an ongoing challenge when you've got people all over the place.

Then, they have to reconcile statements. Each

card provider has a different reporting mechanism. One might be in a PDF and another in a CSV file. Ultimately, they have to run several different reconciliation processes.

Then, they have to do all the job costing so the bills can go out to clients. And they have to accurately code all of that information, assigning it to the right job, and then input it into the general ledger in the Enterprise Resource Planning (ERP) system. Since there's no standardized reporting, there's probably an Excel sheet or two that they must maintain in order to properly label and categorize the data.

They also have to keep track of hundreds of plastic cards outstanding. It's an administrative nightmare—not to mention a fraud risk—as employees churn and as cards get lost or stolen and have to be replaced.

Construction companies also have seasonal or temp workers who need spending capabilities but typically wouldn't receive a company credit card



Technologically sound. Fintechs offer clients streamlined, standardized, automated solutions that make the front and back-end processes around credit card spending much more efficient.

CREDIT: ISTOCK/PAKIN JARERNOEE

given their temporary status. That means they're also handling a reimbursement process for field expenses.

The expense management process might be somewhat easier for the back office than managing multiple card programs, especially if they have newer expense management technology that can capture and code receipts.

The expense management system may not feed that data into the ERP system, which necessitates more manual data entry. Again, the company will have to manually enter data. And, while there might be an ERP integration with the commercial card provider, there probably isn't one for merchant charge cards. A company might have to manually enter transactions or import a flat file report.

Yet again, the result is a disjointed manual process. On top of that, there are people out spending money, but the company doesn't know how much and what for until it receives their expense reports. And asking field staff to file expense reports certainly isn't easy for them, and making things easier for them is the name of the game.

THE FINTECH DIFFERENCE

What fintechs provide is a complete solution of technology and services that consolidate all credit card programs onto one platform. The company deals with one vendor, has one administrative tool, and one predictable back-end experience. That eliminates many of the headaches of managing card programs from disparate providers. There is one consistent source for getting cards to people and managing cards outstanding. All of the statements look alike, which can standardize reconciliation processes. Data is normalized so it's much easier to create dashboards and do analysis. There is one data source to integrate with an ERP.

With a much clearer view into the data, and with the time saved on administration and reconciliation, a company can begin to optimize field spending. It can improve the timeliness and accuracy of job costing. It can get client bills out on time, thereby improving cash flow.

The company can even issue virtual cards—with time, category, and spending limits—to temporary

workers. This cuts down on the number of expense reports field workers need to do, as well as the plastic cards outstanding that must be managed. It also brings that spending out of its own siloed process into the same card management process.

Credit cards are incredible financial and productivity tools. They offer working capital lending, rebates, and ultimate convenience at the point of sale. In construction, they've become invaluable for empowering field workers to minimize job delays.

Unfortunately, the efficiency they deliver to the field has historically been at a cost to the back office. The clear choice in construction is always to put the needs of the field ahead of all else. With today's fintech solutions, when it comes to field spending, accounts payable teams no longer need to choose one thing over the other. **GB**

This article is courtesy of Corpay, an S&P500 corporate financial firm that specializes in helping businesses spend less through simpler and smarter payment methods.

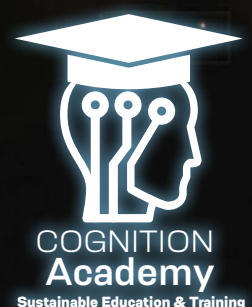
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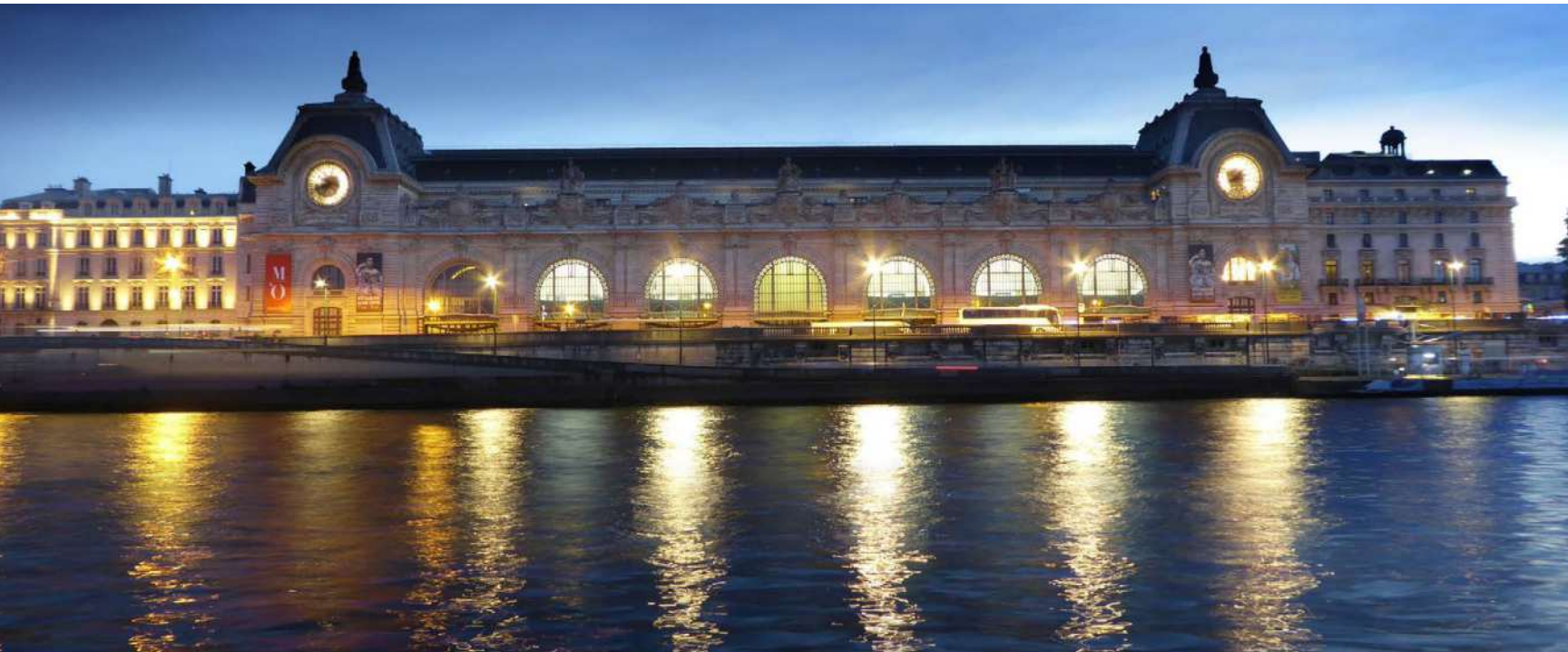
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Past meets present. The famed art museum Musée d'Orsay in Paris, once a train station during the early 20th century, is the inspiration for stylish and sustainable remodeling for homebuilders. CREDIT: FLICKR/GAEL VAROQUAUX

Buildings That Educate: Museums, Homes and Sustainability

Sometimes, the best new green remodeling ideas come from the past.

BY TERRY BEAUBOIS

One of my favorite building types are museums—whether it is the Musée du Louvre (“the Louvre Museum”) or the Musée d’Orsay in Paris, or museums in Vienna, Austria, New York, London, or any other major city and many towns all over the world—because of the educational benefits they naturally bring as an integral factor in their existence.

A few years ago, I visited the Louvre to meet with the head of research and learn how they study, and what they consider when they display the work in their custody, for visitors and the Louvre’s website. It was fascinating and informative. It also provided thoughts on how to design houses.

One interesting fact I discovered is that many of the outstanding museums are “remodeled” buildings—they were not originally designed to be museums. This can give us inspiration for “remodeling

projects” we might have in our own residential design work.

There is the potential for a remodeling project to really “rise to the occasion.” The area that is now the Louvre originally started out as a fortress in the 12th century, then became a royal residence, and then a museum in 1793. Two wings were added later, and then there was the addition of the glass pyramid/entry in 1989.

The Musée d’Orsay in Paris was originally a train station called Gare d’Orsay. That building conversion was designed by Gae Aulenti, an Italian architect who also converted the old downtown San Francisco Library into the SF Asian Art Museum.

Aulenti gave me a tour of the San Francisco Asian Art Museum when it was under reconstruction. It was informative and instructive. I also visited Musée d’Orsay when I was in Paris, with the additional insight from the architect of the “remodeling” from train station to Art Museum.



Second life. A 92-year-old former medical clinic in Palo Alto, California, which has been vacant since 2000, is being transformed into the Palo Alto History Museum, an education tool for city residents. The new facility, which includes sustainable features such as clay tile roofing, reinforced concrete and recyclable stucco, is scheduled to open in 2026. CREDIT: PALO ALTO MUSEUM

Perhaps even in your hometown you have a museum that is a great asset to your community. If not, consider the value of creating one or being on a team that undertakes that endeavor for your own town.

I'm currently involved with the Palo Alto History Museum where I live. It is a fascinating process—one of the most interesting projects in my career. It will be in a building that was originally a medical clinic and is currently being remodeled into the Palo Alto History Museum.

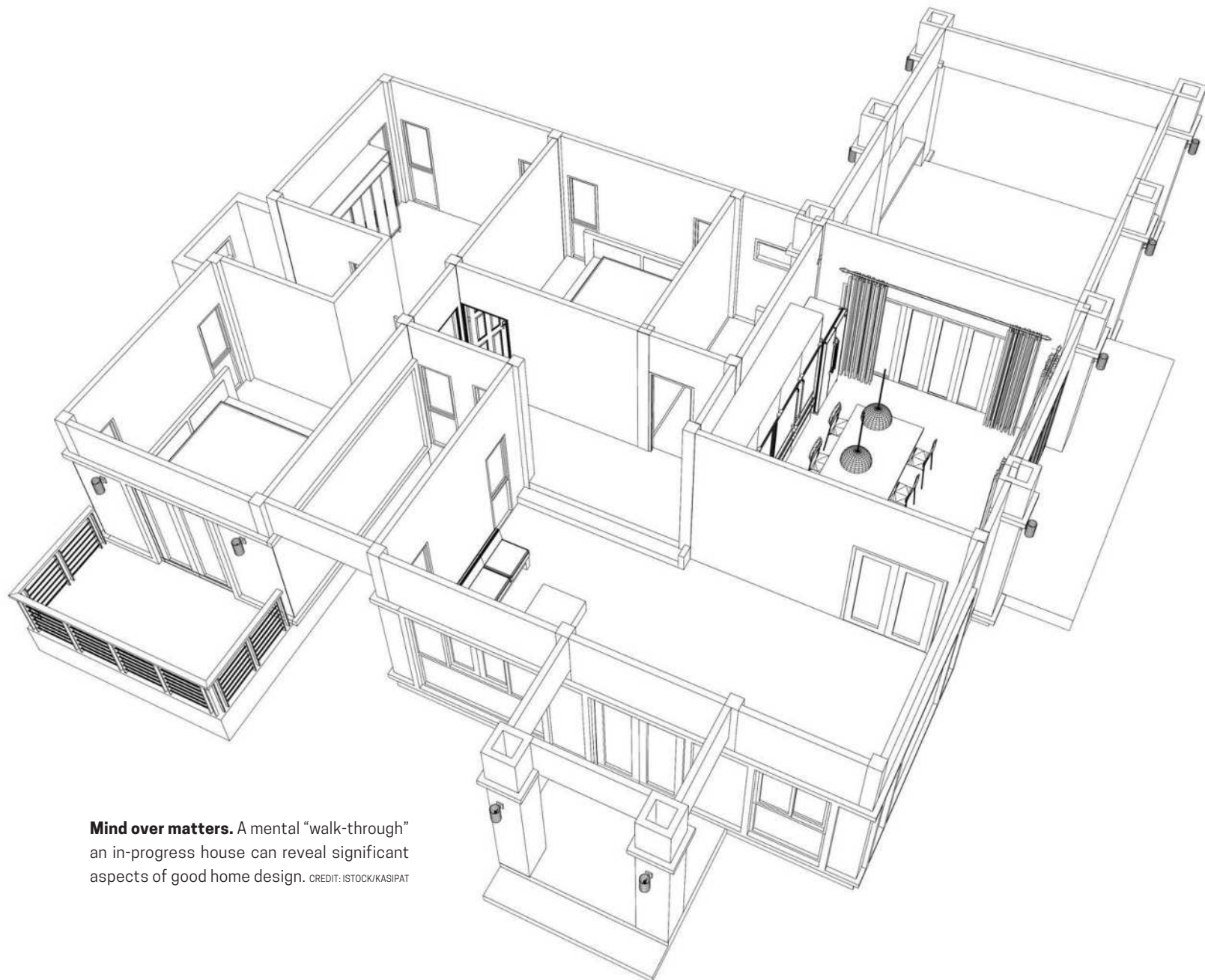
ELEMENTS OF HISTORY IN RESIDENTIAL DESIGN

Whether your house project is period-design influenced or a modern, contemporary design, history and “circulation” can play a significant role in its design and construction. A home is a reflection of the client or family whose house it will be. Doing mental “walk-throughs” of the house to test a design’s accommodation of circulation and displays is a significant aspect of good home design, just like in a museum.

Considering the paths through the house by the homeowners and family members, as well as visitors to the house, can help determine the floorplan layout. People’s desires to emulate a certain period of historical architectural design can significantly affect the exterior design, as well as the organization and arrangement of certain rooms inside the house. Many factors, from informal “farmhouse” design features to formal historically influenced interiors, can play a significant role in the design of any house.

For example, a blank wall implies that something is going to be placed on that wall for people to view. This can be very intentional and controlled in the home’s design.

At the same time, there are areas of many homes where “displays” of family photographs or casual or “collector-level” art, can be designed for. It can be a countertop or a piece of furniture, or a blank wall that will beg for something or accommodate artwork the client already possesses or will soon possess.



Mind over matters. A mental “walk-through” an in-progress house can reveal significant aspects of good home design. CREDIT: ISTOCK/KASIPAT

So, homes have “mini museum” elements that can be featured or accommodated with purposeful design and circulation.

SUSTAINABLE FEATURES

The “sustainable” features of the house can be elements that are obvious or subtle. They are often proud homeowners’ subject of discussion with their visitors and are sure to enhance living in the house, as well as visiting others.

I’ve been involved in a home design where half of the guests at the opening were meeting in the spacious “Mechanical Room.” The interest of some people is significant when having the opportunity to visit a house with interesting features!

A BUILDING FOR THE “COMMUNITY”

Just as a history museum’s design considers the community it is designed for, a house can benefit from considering the “community” of visitors that a single-family homeowner will have. If it is a custom home, the homeowner will certainly enjoy a layout with these museum-related features and considerations, in addition to the way it addresses sustainable design features. **GB**

Terry Beaubois is CEO of BKS: Building Knowledge Systems, in Palo Alto, California. He can be contacted at tbeaubois@gmail.com.

Unconventional Thinking



Stocking up. One way builders can combat higher prices and supply shortages is to purchase as much material in advance as possible (and practical). CREDIT: ISTOCK/STANDRET

With the construction industry being hard hit by inflation, builders need to take a less-traditional approach.

BY SLAWOMIR PLATTA

Whether filling up your gas tank or shopping cart, the impact of inflation remains a thorn in the side of those seeking to purchase goods and services in today's economy. And while the numbers have ticked slightly downward recently from a 40-year high, the effects of inflation continue to plague most business sectors in the United States.

One of the hardest hit is the construction industry, where the price of steel, copper, lumber and aluminum reached all-time highs in 2024. No doubt, the substantial price increases of these materials have had a direct impact on the entire building process, from planning to bidding to completion. And, it's not just new home and office construction that has been adversely affected by the rising prices of these goods. Those in the home décor and renovation industry must also find ways to navigate prolonged wait times for the delivery of vital materials.

Initially brought on by the pandemic that resulted in closures and

delays at international factories producing most of these items, the supply of construction materials has significantly slowed in the United States, driving up the cost of available materials needed to complete the job. And, because building materials are being used as soon as they are manufactured, the wait list for them grows even longer. This leads to costly **project deadlines**, delays, and increased construction and renovation expenses.

These costs are then passed on to the consumer. According to The Wall Street Journal, supply-chain backlogs combined with inflationary pressures have sent new home prices skyrocketing to record levels.

WHAT ARE THE ALTERNATIVES?

To contend with delays and price surges resulting from material shortages, a growing number of designers, contractors and developers are discovering that alternative materials can offer similar strength and design requirements at a fraction of the expense.



At a loss. A shrinking supply of construction materials has driven up the cost of available supplies needed to complete the job, resulting in ever-changing project deadlines, delays, and higher housing prices.

CREDIT: ISTOCK/DERICK HUDSON

Techniques currently being used include substituting cement with other materials that have comparable properties, and reprocessing resources taken from demolition sites that would have ultimately been wasted. However, the lack of qualified training with these new materials can prompt [construction site lawsuits](#) and [workers compensation claims](#), according to insurance specialists.

For instance, materials such as ashcrete, hempcrete and timbercrete can all be viable, lower-cost options to the more traditional concrete. Additionally, prefabricated wall panels and framing systems in wood-framed projects can limit material waste, while used bricks, reclaimed wood, and stone veneers offer additional ways to use recycled materials and save money.

Other examples of non-conventional materials used for the construction and renovation of homes and offices include natural resources like volcanic rock, rammed earth and adobe brick. In addition to being readily available onsite, they present the benefits of added heating and cooling due to the natural insulation they provide. Alternative materials like these are often tied to [sustainability efforts](#) and have proven to be valuable during a supply chain crisis.

From vegetative roofs to mass timber buildings to advanced solar panel technology, the green building space is evolving rapidly. The green building concept itself isn't new, but new technology, materials, and construction methods bring unforeseen risks, according to Alicia Pavelko, head of construction innovation and sustainability at Zurich North America. "The vast majority of the new 'sustainable' or 'green energy' production plants being built are utilizing new and emerging technology," she says. "The underwriters and carriers do not have

the luxury of years of rigorous testing and use to see how the product performs and what delineates a good versus a bad risk."

Purchasing building materials ahead of time is another resourceful way for builders to cut costs. Even if a project isn't immediately in the works, ordering needed materials in advance at a fixed price can help avoid future price increases resulting from inflation. The cost of storing materials now is likely to be less than that of purchasing them in the months ahead.

Implementing modern construction techniques can also help mitigate inflation. Implementing modern techniques, such as building components of the structure in a factory, can help reduce the pain of inflation. Since all components are transported from one place, transportation costs are dramatically reduced. A contractor with a proclivity for efficiency and reducing waste throughout each stage of the project can also be of tremendous value when it comes to keeping expenses down.

LOOKING AHEAD

Chances are, inflation and cost increases to office and home building projects are not going away anytime soon. As a result, designers, contractors and renovators must find innovative ways to cut costs at all stages and stay within budget. Careful planning, flexibility, and a willingness to explore non-conventional building materials, can help reduce inflation risks for ground-up, build-out and renovation projects. **GB**

Slawomir Platta is founding partner of [The Platta Law Firm](#) in New York City, which specializes in personal injury cases.

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span.io/builders

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LG Electronics

Building the Good Life.

lg.com

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COVER 3

Mohawk Everstrand

60 Billion plastic bottles recycled into carpet over the past decade.

mohawktoday.com

COVER 2 AND PAGE 1

Whirlpool

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whirlpoolpro.com

COVER 4

**COMING NEXT ISSUE****Building Science**

With help from the U.S. Department of Energy, we look at cutting-edge homes and projects where performance and affordability are the key.

The simplified smart home

Offer customers seamless device management for water leak detection, air, video and safety products that connect **all in one app**.



Smart water solutions

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IT'S TIME FOR A COMMON PURPOSE



Ron Jones
Co-Founder and President
Green Builder® Media

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Over the years, I've occasionally reflected on life in America today—and how differently things might have turned out if not for one fundamental outcome. What if the Native Americans—whose ancestors had inhabited what we now call North America for thousands of years—had been able to repel the Europeans and prevent them from conquering the continent in just a few centuries?

More specifically, how did these newcomers—who we now call citizens of the United States—manage, through a combination of Old-World diseases, deceitful treaties and negotiations, the near-extinction of the buffalo through systematic slaughter, the construction of a transcontinental railroad, and relentless military campaigns by the U.S. Army—to repeatedly defeat the many capable and courageous Native peoples who once controlled vast regions of the Western Hemisphere?

I believe the answer can be distilled into one simple truth: The indigenous people were completely tribal in their existence and their governance, so they were never able to unite and prevent the Europeans from pursuing a strategy of “divide and conquer” until even the most determined resistance was finally overcome. No single leader ever emerged who was able to bring together the will of the tribes.

Sure, the Europeans came in what must have seemed like endless waves and their more advanced weapons of war provided a huge advantage. But a unified native population may have proved too powerful to defeat.

But it never happened and the rest is history.

Fast-forward to modern times and we can illustrate an analogy in the battles for which forces will prevail in endless wars over the environment. On one side, we have those who are concerned only with maximizing profits regardless of the effects their activities have on the natural systems of the planet. They are powerful, and more importantly, they are organized and capable of exerting incredible influence over policy makers in the United States, and indeed, around the world. Currently, they are calling the shots.

Most frightening of all, they seem to want to seize any and all

opportunities to attack nature purely out of spite. Policies, rules and regulations that protect global environmental systems are targeted with zeal, as if the goal is payback for the inconvenience and obstacles that environmental defenders and advocates have employed in their attempts to preserve the integrity and long-term viability of the planet.

On the other side, there are millions of people around the world who are concerned with the direction we're headed. We can honestly say that there are existential threats to our very existence. Advocacy for nature, the environment and a sustainable future for people and the planet as a whole are essential. Together, they represent tremendous potential for establishing a balanced set of human priorities.

Unfortunately, those who value and work to protect nature seem to exist in camps according to their own special interests. We have people who are totally committed to protecting rivers, forests and soils. Others organize to protect whales or wolves or turtles or elephants or butterflies. Some groups support a wider umbrella, advocating for wildlife in general, the oceans, and climate protections. The devotion to their various causes is critically important and must be sustained.

At the same time, there is a tribal element to all of these efforts. The sustainable building community is a great case in point. A number of admirable organizations have emerged and have enjoyed measurable success in some of their efforts. But in the larger scheme of things, they lack a united cause and that enables the system of economic power to prevail and maintain control of outcomes.

Energy efficiency, water and resource conservation, structural options, durability and resilience, indoor environment quality and comfort are all worthwhile elements but are most beneficial in combination with one another. A sustainable future can only be possible if we work together, collectively and in unison.

Perhaps our “prophet” will emerge and lead us to the promised land but that seems unlikely. Given the current threats to all the things we hold dear and that provide a planet that is full of life, we need to find a way to a common purpose. There is too much at stake to continue to attempt to fight the forces of greed one skirmish at a time. **GB**



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A modern kitchen featuring dark wood cabinetry, a stainless steel range hood, a marble backsplash, and a stainless steel cooktop with multiple burners. To the left is a large stainless steel refrigerator. The countertop is white with a marble pattern. The overall aesthetic is clean and professional.

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