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January/February 2025 / www.greenbuildermedia.com



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GOOD NEWS:

HOUSING STILL CREATES WEALTH



CREDIT: ADOBE STOCK/ROJO

Despite bumps in the road, homeowners have been raking in almost \$30,000 annually in home equity over the past five years.

In this, our 20th year, I'd like to take a moment for some good news: Housing still works. It's still a reliable pathway for middle class people to build wealth, even in a time of high inflation and crisis.

Admittedly, it's harder to buy a home today than it was five years ago. But looking back over the thousands of homes we've encountered through *Green Builder*, I'd say the house you buy today is better built, more efficient and often more attuned to the way people actually live than those built 20 years ago. Just take a look at some of the beauties featured in this, our annual Green Home of the Year Awards Issue.

The million-dollar question, of course, is whether the good times will last, or if housing is a bubble that's about to burst. Of course, that question has been on the table for several years now, yet home values keep rising, defying pessimistic forecasters.

Some industry watchers predict continued growth in the housing market over the next decade, although more of that growth will involve existing homes than new ones. For example, Lawrence Yun, the National Association of Realtors chief economist, [forecasts](#) a 9 percent increase in existing-home sales in 2025, followed by a 13.2 percent surge in 2026.

On the new home front, experts say growth will be slower. [HousingWire](#), for example, reported that the Mortgage Bankers Association projected a 0.1 percent gain in residential investment for 2024, followed by growth rates between 1.1 percent and 3.3 percent in the subsequent three years.

As we enter 2025, with new politics in play and complex trade forces in motion, the housing market seems poised for major shifts. Every imaginable variable is on the table: regulation and zoning, interest rates, material costs, insurance costs, immigrant labor—everything that affects the cost of building and selling homes is in flux. It's far from certain which way the pendulum will swing, but builders will be hanging on to it for dear life.

For those who can afford to buy a home, even with interest rates higher, the wealth building benefits are still there. Take that mantra to your clients and repeat it over and over. Housing is a safe bet. It always has been, if you take a long enough view.

Here's to keeping the good news and the great homes coming in 2025. **GB**



Matt Power
Editor-in-Chief

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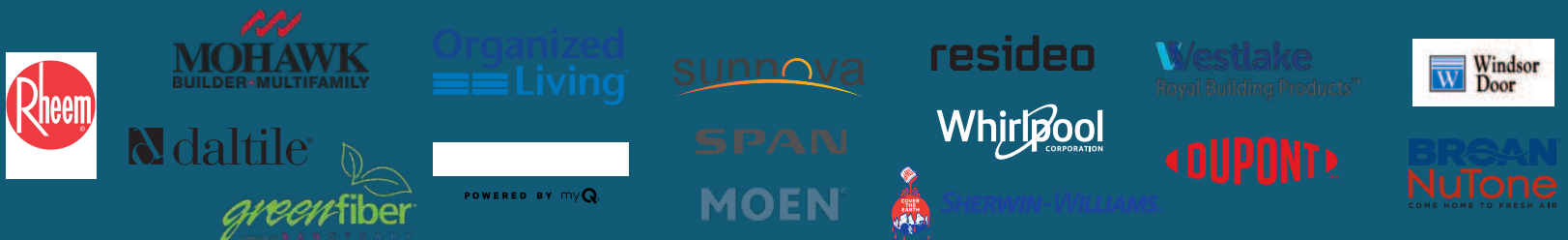
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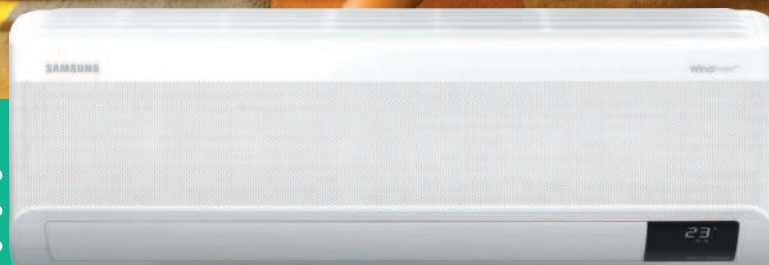
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Much has changed in the past two decades as the green building market, and Green Builder Media along with it, has evolved from niche to mainstream.

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Austin homeowners Judi and Robert George opted for a custom home where they can age in place in a greener home.



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"The house you buy today is better built, more efficient and often more attuned to the way people actually live than those built 20 years ago."

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*Reduces VOC levels from potential sources like carpet, cabinets and fabrics and works to reduce unwanted household odors.

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Green Builder Sustainability Awards 2025

Which people and cities are leading by example when promoting the benefits of sustainable building and thinking? Here is Green Builder's answer.

This year, we honor Jacob Deva Racusin, who has spent decades educating other builders about clean construction, as our Sustainability Superhero. Meanwhile, New York City, Los Angeles, Laguna Beach and Winter Park prove that they can take whatever Mother Nature throws at them. They're our first-ever Survivor Cities. Congratulations to our winners!

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CITIES

MASTER OF MESSAGING



**SUSTAINABILITY
SUPERHERO**

Motivational speaker. Racusin's live presentations have opened industry-wide discussion about embodied carbon in residential buildings, a topic few people even considered just a few years ago. CREDIT: COURTESY OF NEW FRAMEWORKS NATURAL DESIGN/BUILD

Jacob Deva Racusin has spent the better part of this century showing people how great it can be to think green.

BY SARA GUTTERMAN AND ALAN NADITZ

Listen to Jacob Deva Racusin speak and you come away with three thoughts: He loves what he does. He loves what he's done. And he'll really love what he's going to do.

And thus far, he's done a lot.

Racusin's 20-year career in the building industry has had a central focus on environmental responsibility. The Vermont native began in residential design/build as a craftsman in timber

framing and straw-bale construction. He was an early learner and adopter of building science. And, he trained in energy modeling and mechanical system design, bringing his knowledge of energy efficiency and green building to HVAC design.

"I started as an owner builder back in 2000," he recalls. "My wife and I bought an abandoned farm in the mountains of northern Vermont, and I had come from a place of being really interested in sustainable agriculture. As part of that, I realized I wanted to develop a relationship with building shelters, as well as building out my skillsets there."

CARBON CANDOR

Carbon emissions and indoor air quality have been a top priority for Racusin. This is evidenced by the groups he's joined and the research he's promoted.

In 2018, Racusin joined **Builders for Climate Action**, a "social enterprise" of builders, designers,

developers, policymakers, researchers and manufacturers that strives to make building practices climate positive as quickly and intelligently as possible. He served as lead embodied carbon researcher, and was also instrumental in the creation of the Building Emissions Accounting for Materials (BEAM) tool. BEAM measures the amount of embodied carbon in homes. Racusin also developed and delivered training in the use of the tool.

BEAM is software that enables architects, designers and builders to easily compare the carbon footprint of various building materials within a particular category, or quickly create assemblies and whole building models. BEAM quickly and easily identifies carbon hotspots and helps a user identify the best ways to reduce emissions from a project.

The tool and its target product, embodied carbon,





“I’ve been really surprised and delighted to see the adoption and embracement of embodied carbon as a value. There’s a group—specifically the green architectural community, and some leading-edge eco-conscious builders—who are saying, ‘yep, we get it.’”

became a focal point for environmental discussions by Racusin, and industry peers Ace McArleton and Chris Magwood. “[In roughly] 2018, Chris, Ace and I wrote an article for BuildingEnergy Magazine about embodied carbon, which was one of the first times this had been brought to the residential space,” Racusin notes. “That led to a keynote at [the Northeast Sustainable Energy Association (NESEA) conference] the following year, which is really what blew open the topic of conversation within our region and our sector. And the work has very much accelerated from there.”

Most recently, he provided in-depth research on embodied carbon of mechanical, electrical and plumbing (MEP) products for the [RESNET 1550 standard development](#) and for the Canadian federal government. RESNET 1550 is an extension of the RESNET Carbon Index, which covers operational carbon emissions. The 1550 guidelines provide a

standardized method to calculate and report the embodied carbon impact of homes.

He is also a founder and current steering committee member of the [Bio-Based Materials Collective](#), established in 2024 to build momentum among builders, designers, manufacturers, farmers, and foresters for adoption of carbon-storing materials. Racusin is engaged in code and policy development, professional training, and other initiatives supporting the transition to a “more just industry.”

EDUCATIONAL OUTREACH

A central part of Racusin’s working life is [New Frameworks Natural Design/Build](#), a sustainability-embracing worker cooperative that “offers a new framework for ecological design and construction.” Racusin is the co-founder (along with McArleton) and its director of sustainability

and building science. He is a key participant in the development of the company’s prefabricated straw wall panel business, and offers services in renovation, new construction, consultation, and education.

On the education side, Racusin is an instructor at the [Yestermorrow Design/Build School](#), where he is the former director of the school’s Natural Building Intensive Program. About 14 years ago, he was a student there himself. He learned enough to build his own home after about six years.

“That program was really my formal education,” Racusin says. “I had a really good mentor help teach me how to design and build. So I came into this work as an owner/builder with natural building technologies. And before I finished building the house, I realized that I really loved building and construction.”

He and others teach design and building as an



A goodness group. Racusin and other members of New Frameworks Natural Design/Build work to create homes that are stylish, more efficient and carbon healthier. CREDIT: COURTESY OF NEW FRAMEWORKS NATURAL DESIGN/BUILD

integrated process through hands-on education through nearly 100 classes such as Land and Community Planning, Whole Structure Design/Build, Building Systems and Building Science, Woodworking and Craft and Tutorials.

Throughout his career, Racusin has been an active conference speaker and educator, and in 2025 is leading the content development for the [NESEA Building Energy Boston Conference](#).

And there are the books he's written.

[“Essential Building Science: Understanding Energy and Moisture in High Performance House Design,”](#) a step-by-step

guide to making, installing and living with beautiful, all-natural earthen floors; and [“The Natural Building Companion: A Comprehensive Guide to Integrative Design and Construction,”](#) co-authored

with McArleton, which helps builders understand basic principles of building science, including structural and thermal engineering, and hydrodynamics. Both are considered invaluable resources for anyone with green construction in mind.



ENJOYING THE RIDE

Racusin has changed with the times. After the Recession's impact on residential construction, he shifted from heavily focusing on revolutionary building science techniques—such as airtight straw-bale construction, and air fin transitions from plaster to wood—for new homes and residential buildings, to working on existing ones. “We realized we were not hitting our social or environmental goals, only building new homes for affluent clients,” he says.

He became triple-certified by the Building Performance Institute (BPI) as a building analyst, envelope professional, and healthy homes evaluator, a certified Passive House consultant (CPHC), and an Efficiency Vermont partner contractor for the Home Performance with ENERGY STAR program. This was at about the same time that New Frameworks went from simply construction to being a full-on design/build firm. Racusin also began focusing on building enclosure and mechanical design, and



Smooth operator. Teaching the world to think green is hard work—which is why Racusin likes to chill out with an occasional jam session.

CREDIT: COURTESY OF NEW FRAMEWORKS NATURAL DESIGN/BUILD

energy modeling alongside some of the field verification.

New Frameworks later pivoted from being a custom builder and custom service provider to manufacturing straw-insulated building panels and prefabricated ADUs and small homes.

“With the cost escalation and housing crisis, custom construction wasn’t meeting the needs of our communities, and we were just spending a lot of time putting very few people into buildings,” Racusin says. “So I’m moving further away from that work now that we’ve transitioned into being a fabricator. I’m still working in that realm from a building science and capacity building level, and still doing a lot of outward consulting and internal consulting. But more of my work is really now shifting towards standards and policy, and the BEAM tool, now that it’s serving an ever-bigger role as the industry starts embracing the need for embodied carbon metrics and strategies and solutions.” **GB**

SUPERHERO STATS

SOME OF JACOB DEVA RACUSIN'S CAREER ACCOMPLISHMENTS INCLUDE:

- Co-founder and director of building science and sustainability with [New Frameworks Natural Design/Build](#), focusing on mechanical, water, energy and enclosure system design and quality control.
- Lead embodied carbon researcher and Building Emissions Accounting for Materials (BEAM) estimator tool trainer with [Builders for Climate Action](#) where he is involved in embodied carbon research and development and training.
- Conducted in-depth research on embodied carbon of MEP products for the [RESNET 1550](#) standard development, and for the Canadian federal government.
- Co-author (with Ace McArleton) of [“The Natural Building Companion, A Comprehensive Guide to Integrative Design and Construction,”](#) and author of [“Essential Building Science: Understanding Energy and Moisture in High Performance House Design.”](#) Both books are landmark publications on the fundamentals of earth-based construction.
- Director of the Building Science and Net Zero Design Certificate Program at the [Yestermorrow Design/Build School](#), which specializes in hands-on construction education.



Survivor Cities 2025

No weather catastrophes, fire or climate change can keep these sustainability vanguards down.

BY MARC HUMINILOWYCZ

Flooding, extreme heat, wildfires, hurricanes, storms—there’s a saying among environmentalists and geographers that natural disasters are only catastrophes when people and communities get in the way.

Since the beginning of time, nature has always done what it needs to do to maintain balance and equilibrium on Earth, often with no consideration for the welfare of humanity. Today we are in a state of climate crisis, with global temperatures rising at an unprecedented rate, causing more frequent episodes of extreme weather and natural disasters. Once-in-a-hundred-year storms occur annually, and with greater severity.

According to the latest data from the National Oceanic and Atmospheric Administration (NOAA), in 2024 (as of November 1),

there were 24 confirmed weather/climate disaster events with losses exceeding \$1 billion each to the affected states. These included 17 severe storm events, four tropical cyclone events, one wildfire event, and two winter storm events. Overall, these resulted in the loss of 418 lives and had significant economic effects on the areas impacted. The 1980 to 2023 climate disaster event annual average was 8.5. For 2019 to 2023, it was 20.4.

Despite our best efforts to reduce global warming, the Mantra of our time has become “climate resiliency,” especially in the design and construction of urban buildings and infrastructure. In a concerted effort to mitigate the effects of flooding, extreme heat, wildfires and hurricanes, four U.S. cities—New York, Los Angeles, Laguna Beach, California, and Winter Park, Florida—have gone to special lengths to protect their citizens and prepare for future climate change.



GREEN BUILDER *Sustainability* **Awards 2025**

**SURVIVOR CITY:
FLOOD RESILIENCE**

Preparing for a wet future.

New York City officials are developing “The Big U,” a five-piece comprehensive flood defense for Lower Manhattan (outlined in yellow) that is expected to be completed before 2050.

CREDIT: THE BIG TEAM REBUILD BY DESIGN

NEW YORK CITY: THE BIG U

On Oct. 29, 2012, Hurricane Sandy hit America’s largest city. It flooded the subway system, many of its suburban communities, and all road tunnels except the Lincoln Tunnel, entering Manhattan. Sandy impacted 13 states, including New York, resulting in more than \$65 billion in damages and economic loss.

In New York City, the low-lying setting of Lower Manhattan, from West 57th St. down to The Battery and up to East 42nd St., is home to about 220,000 residents and is the core of a \$500 billion business sector that influences the world’s economy. Hurricane Sandy devastated not only the Financial District, but also 95,000 low-income, elderly and disabled residents.

In response to the devastation, in 2013 President Obama’s Hurricane Sandy Rebuilding Task Force launched an innovative design competition, “Rebuild by Design.” This event assembles global expertise with regional leadership,

and community stakeholders to gain a better understanding of how overlapping environmental and human-made vulnerabilities leave communities at risk.

Rebuild by Design coupled innovation and global expertise with community insight to develop solutions to the most complex needs of the affected cities and regions. The result of this was a multi-billion-dollar New York City project called “Lower Manhattan Coastal Resiliency (LMCR),” or its more-familiar name, “The Big U,” for its shape on the city map.

“Rebuild by Design creates teams for the design and construction of climate-mitigating measures around the world,” says Rebuild Managing Director Amy Chester. “The LMCR was an innovative competition, with first-time-ever designs for the future.”

Jordan Salinger, the city’s director of adaptation strategies with the Mayor’s Office of Climate and Environmental Justice, considers the LMCR a key part of New York’s weather safety efforts. “As part of the LMCR design competition,



Clear sailing. Since 2002, New York City has invested more than \$6 billion in water quality, helping to make New York Harbor the cleanest it has been in more than 100 years.

8.3 million
Population

Two feet
Projected sea level increase
by 2050

Five
Projects planned as part of
the Lower Manhattan
Coastal Resiliency

our office has been working with many different agencies over the past 10 years, looking at all hazards to our city, including flooding, coastal storms, and extreme rains,” Salinger says. “We expect to see an increase in sea level and coastal storms of about two feet by 2050, causing our waterfront to flood daily. This would severely impact our infrastructure, subways, ferries, and jobs.”

Five separate projects are being implemented as part of the LMCR, each constructed to provide comprehensive flood defense for Lower Manhattan, tailored to respond to individual neighborhood typology and community-desired amenities: the Brooklyn Bridge-Montgomery Coastal Resiliency; South Battery Park City Resiliency; the Battery Coast Resiliency; North/West Battery Park City Resiliency; Seaport Coastal Resiliency; and FiDi-Seaport Master Plan. Construction is underway for the first three projects, with scheduled completion dates for all by 2030. The current budget for the entire LMCR is \$5.4 billion.

In addition to The Big U, New York has implemented Climate Resiliency Design Guidelines that require new developments to consider future flood risk in their designs, elevating structures and protecting critical infrastructure. “Focusing on life cycle, we’re connecting the latest science with design innovation in the built environment,” says Salinger.

There is also a Green Infrastructure Plan in place to manage stormwater that can overwhelm the combined sewer system when it rains. This includes advanced street-tree pits, porous pavements and streets, and green and blue roofs to improve water and air quality, help cool the city, reduce energy bills and greenhouse gas emissions, and beautify communities.

Since 2002, New York has invested more than \$6 billion in water quality, according to the Plan document. As a result, New York Harbor is now the cleanest it has been in more than a century. **GB**



GREEN BUILDER Sustainability Awards 2025

SURVIVOR CITY:
HEAT RESILIENCE

Staying cool. The Cool°Streets LA initiative is designed to help teach Los Angeles residents about the benefits of sustainable behavior change as the city works toward becoming carbon-neutral by 2030. CREDIT: COURTESY OF EMPOWERMENT INSTITUTE

LOS ANGELES: COOL°STREETS LA

With a laid-back vibe and abundant sunshine year round, Los Angeles has long been a Mecca for Americans looking for a better quality of life. But with climate change, all of that sunshine has come at a cost. The city is experiencing a greater number of extreme heat days (when the peak temperature exceeds 95 degrees Fahrenheit). In some of its hottest neighborhoods, the number of annual extreme heat days is expected to double in the next 20 years.

Enter “Cool°Streets LA,” part of an initiative of the Empowerment Institute, a global training and consulting organization devoted to achieving measurable and sustainable behavior change for a better planet. The Empowerment Institute has been working on empowering American cities, including Los Angeles, to become carbon-neutral by 2030.

Cool°Streets LA was launched in 2019 to lower the temperatures in L.A.’s warmest neighborhoods by adding 2,000 trees and 60 miles of cool pavement to increase the city’s tree canopy and lower road temperatures by up to 15 degrees F.

North Hollywood Mayor Eric Garcetti points to a recent effort to apply reflective coating to a section of Los Angeles Avenue as an example of the city’s climate change battle. “The skyrocketing temperatures of our streets is an equity issue that puts local communities on the front line of the climate crisis,” he says. “Our hottest and most vulnerable neighborhoods are our top priority when it comes to climate action. [Cool°Streets LA] is about taking action in ways that will make a direct impact on people’s lives.”

Reflective gray paint creates cooler pavements with surfaces that reflect heat and do not absorb as much of the sun’s energy as traditional black pavement. CoolSeal gray, initially developed



Hot street affair. Los Angeles is combating high temperatures in city neighborhoods by using reflective gray paint on asphalt that absorbs less of the sun's energy vs. traditional black pavement and is therefore cooler to walk on. CREDIT: COURTESY OF EMPOWERMENT INSTITUTE

3.8 million
Population

95+
Outdoor temperature
(in degrees Fahrenheit)
considered “extreme”

2,000
Trees added as part of
Cool°Streets LA

by California-based asphalt coating manufacturer GuardTop in conjunction with the defense industry, is being applied in Los Angeles' most vulnerable neighborhoods. As of 2023, 175 lane miles have been coated, covering 600 street segments.

According to the Los Angeles Bureau of Street Services, approximately 10 percent of the city—about 69,000 city blocks—is asphalt. It believes that coating just one-third of the asphalt could help to reduce the average city temperature. The city is currently evaluating the cost of applying the coating on a large scale, which costs approximately \$40,000 per mile and lasts about seven years.

An equally important component of Cool°Streets LA is planting trees for shade on neighborhood streets. The City of Los Angeles, through its City Plants program, is offering property owners, businesses, schools, and apartment homeowners associations

free and delivered shade trees for planting in yards, on private property and those strips between the sidewalk and the street. It is committed to planting 90,000 trees by 2028 to increase shade and moderate rising temperatures.

And then there is the problem of buildings with heat-absorbing black or dark shingles—a desirable attribute in cold climates, but a major contributor to city warming in sunny California. As of 2013, Los Angeles has required all new and refurbished roofs to be “cool,” meaning that they reflect more sunlight and absorb heat. A “Cool Roof” uses new products that efficiently do this, lowering temperatures on hot, sunny days to keep home interiors cooler and reducing energy consumption from air conditioners. According to the Global Cool Cities Alliance, a Cool Roof doesn't necessarily have to be white, although this color is ideal. It can also be shades of gray or red. **GB**



GREEN BUILDER Sustainability Awards 2025

SURVIVOR CITY:
WILDFIRE RESILIENCE

Faded scars. Laguna Beach and surrounding areas have recovered from the Big Wildfire of 1993. But the city is taking steps in fire safety to prevent another disastrous event. CREDIT: FLICKR/KEN LUND CC 2.0

LAGUNA BEACH: GOATS VS. WILDFIRES

According to the municipality of Laguna Beach, California, approximately 85 percent of the city and its surrounding 42,000 acres of protected wilderness and open space are designated by CalFire as a Very High Fire Hazard Severity Zone. After igniting on Oct. 27, 1993, the biggest wildfire in the city's history burned more than 16,000 acres and destroyed hundreds of homes in Laguna Beach and neighboring Emerald Bay.

"Because of our extreme wildfire risk, the City of Laguna Beach has implemented robust fire safety ordinances and vegetation management to protect our community and our natural environment," says Niko King, fire chief with the Laguna Beach Fire Department.

In a recent interview, King outlines these fire safety efforts:

- Fire safety ordinances, including defensible space requirements. All properties must maintain 100 feet of space around structures, which includes removing dead vegetation and trimming tree canopies. Also, fire-prone plants, such as pampas grass, bamboo, junipers, and eucalyptus, are prohibited within defensible spaces.
- Fire-resistant building standards. These include tempered glass windows, Class A fire-rated roofing materials, non-combustible siding, and spark arrestors on chimneys.
- Weed abatement program. Property inspections conducted by the Fire Department to ensure that overgrown and hazardous vegetation is cleared.

Cleaning crew. The city's grazing program uses goats to devour flammable vegetation efficiently in high-risk areas. CREDIT: COURTESY OF LAGUNA BEACH FIRE DEPARTMENT

22,000
Population

16,000
Acres burned by Laguna
Beach-area wildfire in 1993

100
Required minimum footage
of defensible space around
all homes

- Vegetation management programs, including 500 city-maintained acres of fuel modification zones surrounding Laguna Beach neighborhoods; home hardening inspections in partnership with residents to identify risks and recommend fire-safe improvements; and a goat grazing program, which uses goats (yes, goats) to gobble up flammable vegetation efficiently in high-risk areas.
- Community preparedness training, including: public education, such as an Emergency Preparedness Month Awareness campaign and neighborhood outreach events to ensure that residents are informed about evacuation plans, emergency kits, and home hardening techniques;

The latest technology for notifying residents in the event of an emergency, such as text messaging through local West Nile Virus (Nile) alerts, and notifications via an outdoor warning system with speakers installed throughout the city for messaging and safety actions; and free wildlife consultation.

"Fire is a constant threat in Laguna Beach," King emphasizes. "Our stringent and comprehensive safety ordinances and vegetation management programs reflect our city's commitment to reducing wildfire risks through proactive policies, community engagement, and innovative solutions." **GB**

GREEN BUILDER Sustainability Awards 2025 SURVIVOR CITY: HURRICANE RESILIENCE

In deep. Only 2 percent of Winter Park's residents lost power during Hurricane Milton in 2024 because 80 percent of the city's power lines are buried underground.

CREDIT: COURTESY OF CITY OF WINTER PARK



Electric utility

services

Delivering as promised! UNDERGROUNDING PROJECT



WINTER PARK: AN UNDERGROUND MOVEMENT

In October 2024, Hurricane Milton devastated parts of Central Florida, leaving hundreds of thousands of households without electricity, unable to keep warm, cook food, or even switch on the TV to get the latest weather updates. It was a different story in the city of Winter Park near Orlando where, at the peak of the storm, only about 275 of 15,000 customers—less than two percent—did not have power. The reason? Eighty percent of the city's power lines are buried underground.

"Undergrounding" began in Winter Park about 20 years ago, with the goal of improving power reliability and aesthetics. According to City officials, about 95 of the 130

miles included in the project have been completed, and work is progressing at a pace of approximately eight miles per year. "It's like planning for retirement," says Winter Park City Manager Randy Knight in a media interview following Hurricane Milton. "You have to go ahead and start. If you don't start, you'll never finish. And when something like this happens, we're not spending a whole week on repairs. We spent 12 hours."

Because Winter Park's utility is owned by the City, it is able to provide the undergrounding service while maintaining rates that are below the average for Florida. And because the City has local control over its finances, it is able to reinvest



Devastating lesson. In 2024 Hurricane Milton destroyed homes throughout central Florida. But the city of Winter Park fared better thanks to investment in modern construction. CREDIT: COURTESY OF FLORIDA NATIONAL GUARD

30,000
Population

12
Hours required by city for
repairs after Hurricane Milton

100
Percentage of city's electric
power lines underground
by 2030

all profits and revenues back into the system to pay for these undergrounding efforts, preventing an additional tax burden to its residents.

“Almost all of the outages we had after Hurricane Irma (in 2017) and this latest storm are related to the overhead part of the system, not the underground part,” explains Randy Kirby. “Investor-owned utilities in the state are obviously responsible to their shareholders for profits. But there are 33 municipal-owned utilities, including ours. Over the years, the community has made the decision on how we reinvest the profits.”

It would have been easy to take the extra revenue and build

a park or redo City Hall, Kirby notes. But city commissioners who took over the power system from Progress (now Duke) Energy nearly two decades ago stayed committed to undergrounding.

Despite pandemic delays, undergrounding is expected to be completed in 2030 at a cost of about \$8.5 million per year—a significant number for a city with a \$200 million annual budget. These dollars are coming from the reinvested utility rate revenues.

When the project is complete in 2030, Winter Park expects to be the first city in America to have 100 percent of its electric lines underground, according to Kirby. **GB**



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GREEN HOME OF THE YEAR AWARDS 2025

BY ALAN NADITZ

No home can be too energy efficient, too intelligent or too disaster proof. Due to Mother Nature's savage temperament in 2024, Green Builder's newest Green Home of the Year winners have focused on building homes that function at a high level, no matter the circumstance. Our 2025 class showcases ways to design homes that are smarter, stronger and innovative.

Our expert panel of judges evaluated projects in terms of overall sustainability, resilience, synergy with the environment, affordability, creativity and the depth of science employed. Here are their choices for the most exemplary and more imaginative green homes of 2025.

THE JUDGES

ROB HOWARD is president of Howard Building Science based in Granite Falls, North Carolina. He provides general contracting and consulting in the High Country and Foothills of Western North Carolina.

Howard is the former director of construction at Habitat for Humanity of Catawba Valley, where he built ENERGY STAR homes through Advanced Energy's SystemVision program. He built the first net-zero energy home in North Carolina in partnership with the Appalachian Energy Center in 2005. He also built the first DOE Zero Energy Ready Homes in North Carolina in 2015.

He holds a master's degree in sustainable technology and building science from Appalachian State University, where he is a lecturer.



TRACY HUYNH is a senior associate in the Embodied Carbon team within RMI's Carbon-Free Buildings Program. She leverages her expertise in structural engineering, mass timber construction, and life-cycle assessment analyses to support the team's goals of reducing carbon embodied in building materials to meet rigorous climate targets.

Prior to joining RMI, Huynh led the structural engineering development for prefabricated, mass timber building components of multi-residential buildings in Vancouver. At Knippers Helbig in New York, she engineered and managed numerous projects, including one of the country's largest steel grid shells and mass timber structures.



From the Judges

"This project is an excellent example of a deep energy retrofit that preserves the historic character of the home while updating the building envelope and mechanical systems."



CREDIT: ALL PHOTOS COURTESY OF ERIC HAUSMAN PHOTOGRAPHY/ERIC HAUSMAN

Past + Present = Future

Early 20th century history meets a sustainable future in this energy-efficient renovated home.

BY AMY HENDERSON AND ALAN NADITZ

When they considered the idea of a housing remodel, owners of the Passive House Institute U.S. (PHIUS) ZERO Historic Renovation project in Oak Park, Illinois, had a simple thought: They wanted “a house of the future inside a house of the past.”

That future home, as envisioned by the owners, was to make the kitchen an important central gathering point without compromising workspace or visually taking over the interior. Home office spaces and a gym were requested. There was to be a “strong connection” to the backyard for family activities. And the house was to be an all-electric house with low baseline energy consumption, solar panels, and backup power.

The homeowners got their wish: Their 3,568-square-foot project is a PHIUS Source Zero pre-certified retrofit of a 1902 house in an Oak Park Historic District. Bringing the house in line with modern ideas about space, energy, technology, and health effectively meant a gut renovation, something that



About face. To keep the house roof visually intact, solar panels were installed on the east- and west-facing gabled garage roof.



Bright sight. PHIUS ZERO makes extensive use of natural lighting and energy-efficient LED downlighting.

Project Stats

NAME: [PHIUS ZERO Historic Renovation](#), Oak Park, Illinois

GENERAL CONTRACTOR: Erik Bosi, [Bosi Construction Company](#)

ARCHITECT/DESIGNER: Tom Bassett-Dilley, [Tom Bassett-Dilley Architects \(TBDA\)](#)

STRUCTURAL ENGINEER: [Carsello Engineering](#)

LANDSCAPE ARCHITECT: Carol J.H. Yetken, [CYLA Design Associates](#)

PHOTOGRAPHER: Eric Hausman, [Eric Hausman Photography](#)

"We wanted to prove that even an old house can meet historic preservation criteria, while meeting and exceeding 21st century goals for quality, energy efficiency and resilience."

**—Tom Bassett-Dilley, founder,
Tom Bassett-Dilley Architects (TBDA)**



Chemical-free environment. Stairway bannisters and walls throughout the home feature no-VOC paints.

Bosi Construction Company and **Tom Bassett-Dilley Architects (TBDA)** completed in December 2023.

“Our mission is to help build a clean energy future, and scaling up decarbonization is one of our main strategies,” says TBDA architect and owner Tom Bassett-Dilley. “Clients find us and ask for this kind of project. We wanted to prove that even an old house can meet historic preservation criteria while meeting and exceeding 21st century goals for quality, energy efficiency, and resilience. We believe that this proof-of-concept project can inform many other future retrofits.”

TBDA also believes that this kind of thinking is a key strategy for the best, fastest path to net zero emissions by 2050, radically reducing energy use of old buildings. Only a modest upfront embodied energy input is needed in communities like Oak Park, where the greatest share of greenhouse gas emissions comes from heating old, leaky buildings. Tearing down and building new is not a viable strategy, as it requires huge amounts of upfront embodied energy in materials, while throwing away the old material.

The company notes that unlike cars, whose shape and construction materials have modernized significantly from the early 20th century, most homes are still constructed with a concrete foundation, wood framing, and brick and stucco cladding. This home’s overall mass, window area, and orientation are passive in nature since the home was built before large mechanical systems were a viable option.





CLEAN AIR CONSCIOUS.
No-VOC paints are used on walls and ceilings throughout the home.

EFFICIENT REFRIGERATION.
Appliances, such as the LG refrigerator, are ENERGY STAR rated.

HARD FACT.
All-natural premium Quartz countertops are durable and easy to maintain.

RENEWABLE FLOORS.
White oak provides quality, chemical-free flooring.

Key Components

APPLIANCES: Sub-Zero and Wolf induction cooktop (WCI365TFS); Sub-Zero and Wolf wall oven (SO3050PE/S/P); LG wash tower (WKHC202HBA); LG refrigerator (LMWS27626S); Miele dishwasher (G5266SCViSF)

BUILDING ENVELOPE: AeroBarrier

CABINETS, SHELVES, MILLWORK: Four Acre Wood Products (Amish Cabinet maker)

CAULKS AND SEALANTS: Prosoco R-guard, Titebond *WeatherMaster Ultimate MP*

COUNTERTOPS: Calacatta Montage Quartz - *White Quartz - Q Premium Quartz*

DOORS AND HARDWARE: Masonite, Emtek

ELECTRICAL: AM&L Electric Inc.

EXTERIOR FINISHES: James Hardie

FIRE PROTECTION: Central States Automatic Sprinklers, Inc.

FLOORING: Hardwood: 3.25-inch white oak, select and better (Unique Flooring Chicago). Tile: Tile Bar

GARAGE DOORS: Haas *American Tradition*

HOME CONTROLS: Electronic Lifestyle Associates; Lutron

HVAC/DUCTS: A-Team Heating & Air Conditioning; *ClimateMaster Trilogy 45 Q-Mode* geothermal heat pump; Santa Fe *Ultra 120* dehumidifier

INSULATION: Owens Corning *Natural Polymers Natural-Therm HFO* closed cell spray foam insulation; Applegate Insulation dense pack cellulose insulation

LANDSCAPING: CYLA Design Associates, Inc.

LIGHTING: DMF Lighting Home - DMF Lighting for all cans. Scones: visual comfort, rejuvenation

PAINTS AND STAINS: Benjamin Moore

PLUMBING/PLUMBING FIXTURES: Grohe, Kohler, Elkay

RENEWABLE ENERGY SYSTEMS (SOLAR, WIND, ETC.): Kapital Electric, Panasonic Evervolt Solar, Tesla Powerwall

ROOF: GAF Timberline HDZ (Barkwood) Shingle, GAF TPO

TELECOMMUNICATIONS: AT&T Fiber

VENTILATION: Build Equinox CERV2 (conditioning energy recovery ventilator), Panasonic *Intelli-Balance ERV*

WATER HEATING: ClimateMaster *iGate Smart Tank* geothermal heat pump, *D'mand Kontrols ACTI* recirculation pumps

WINDOWS, SKYLIGHTS, PATIO DOORS: Alpen Zenith windows, H Window Nordic door, Velux skylights, Waudena entry door

- 1 Historic exterior preserved
- 2 Continuous retrofit air barrier with AeroBarrierDouble
- 3 Retrofit double stud wall construction for extra insulation
- 4 Roof retrofit with sistered rafters and closed cell spray foam
- 5 Continuous insulation over the foundation with mineral wool batts in framing
- 6 Retrofit slab with new vapor barrier and underslab insulation
- 7 Closed cell spray foam at existing rim joists
- 8 Triple pane Passive House certified windows
- 9 New energy efficient North-facing skylights
- 10 Continuous energy recovery ventilation
- 11 Geothermal heat pump for heating, cooling, and dehumidification
- 12 Energy efficient water heating from geothermal heat pump system
- 13 Energy Star rated appliances
- 14 On-demand hot water recirculation system
- 15 Low-flow fixtures
- 16 New interior drain tile with sump pump
- 17 LED lamps in all fixtures

Multipurpose property. The PHIUS Zero Historic Renovation project is packed with sustainability and energy efficiency features on the inside and out.

CREDIT: TOM BASSETT-DILLEY ARCHITECTS (TBDA)

As a result, significant changes were required to bring the home into the 21st century.

WELCOME 'BACK'

Homes of the early 1900s typically treated the back of the house as a "service" area, with minimal openings and little storage. Outdoor space was focused on the front porch, which was most likely the main entrance. With more frequent car use, more stuff needing a place (mudroom), gardening, and outdoor grilling and playing, the back entrance needed a whole different expression—including some architectural love, like the rest of the house.

The back entry was reconstructed on-grade with a sheltered patio outside. The ceiling height now matches the main first level, so there are impressive sight lines from the kitchen out and down to the patio and backyard. Meanwhile, the big roof shades the east-facing windows while making a strong outdoor space.

INSULATION, WHERE ART THOU?

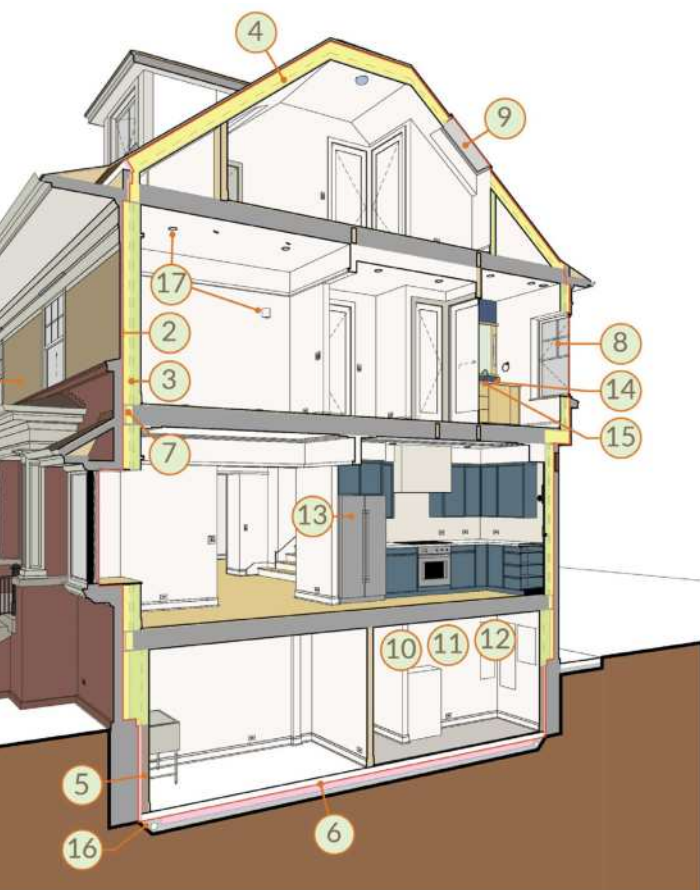
This was an eye-opener, according to TBDA: The old house didn't have any insulation, period. The necessary retrofit included all surfaces of the thermal envelope, as continuously as possible.

This required redoing the basement slab, which enabled a capillary break/vapor barrier, passive radon system, and insulation at the bottom of the house. These steps are needed to ensure a healthy interior. "We used just enough HFO-blown closed cell foam to protect against condensation risk, and filled the rest with cellulose," Bassett-Dilley notes. "To get the optimal insulation level, we framed a new wall a few inches to the interior, which let us create level, square, and smooth interior surfaces."

AIRTIGHT VS. LEAKY: NO CONTEST

Given that the original house was built before the membranes, tapes, and sealants that exist now, it was no surprise that the house leaked like





FLOOR PLAN



CREDIT: TOM BASSETT-DILLEY ARCHITECTS (TBDA)

"There were plenty of challenging details to execute, such as finding a pathway for the cooking hood makeup air, and getting the geothermal and energy recovery ventilation ductwork to fit within the structure."

**—Tom Bassett-Dilley, founder,
Tom Bassett-Dilley Architects (TBDA)**

a sieve, TBDA notes. The insulation strategy needed to align with an airtightness strategy that accounts for all penetrations—such as windows and exhaust vents—and connects between surfaces (slab, foundation, framed walls, and roof).

Following window installation and slab and insulation work, TBDA used a non-toxic aerosolized compound that filled all the gaps as the house is pressurized with a blower door during installation. This typically isn't needed on new construction but can be a godsend on old buildings with complex geometry, TBDA notes.

Troubleshooting lack of airtightness on such an old house proved to be a construction lesson. "It can take multiple passes at blower door testing and sealing," Bassett-Dilley notes. "The cramped and complex roof/wall intersection prevented easy access, requiring multiple attempts."

GOODBYE TO NATURAL GAS

As a decarbonization project, TBDA approached PHIUS Zero like its other retrofits: It dropped reliance on natural gas, opting instead to use ground-source geothermal heat pumps for heating, cooling, water heating, and the clothes dryer, and switching to induction for the cooktop.

Accommodating enough solar photovoltaics (PV) within historical guidelines to offset the house energy proved to be a challenge. To keep the house roof visually intact, solar PV was installed on the east- and west-facing gabled garage roof (per the town's Historic Preservation Commission requirements), with a small additional array on the addition's low-slope roof.

"We were surprised how resistant the Historic Preservation Commission was to our initial proposal for a solar PV-covered new garage facing the street," Bassett-Dilley notes. "In light of that opposition, we rotated the garage so the panels were not as visible from the street. It cost us about 15 percent efficiency but allowed the project to

move ahead."

A backup battery system allows for resilience in the event of power outages by supplying critical circuits while being fed from the solar array.

The installation was so successful that the home's energy bills are near zero. The home is also healthier, according to TBDA. "Cooking and line leaks inside the home have been shown to be significant pollutants, often making homes more toxic than the outdoors," Bassett-Dilley notes. "The big-picture energy future is that electrification plus renewables equals zero emissions—it's where we need to go."

ON THE GROUND, IN THE AIR

Older homes use a lot of coal or gas to heat their uninsulated, leaky shells. TBDA's model is the reverse of that, insulating and tightening enough that only a small amount of energy is needed to maintain comfort. Ground-source heating is more efficient than air-source, but tends to require a single ducted system, versus smaller distributed systems common with air-source. And because all tight houses need good ventilation, TBDA uses balanced energy recovery ventilation (ERV) systems to extract pollutants from areas such as the kitchen, baths, laundry, workshops—even cat litter boxes—and provide equal fresh air to bedrooms and living spaces.

About 80 percent of the energy of the outgoing air is transferred to the incoming air, so it's an efficient way to maintain healthy, filtered air, TBDA notes. MERV 13 and higher filters can even remove significant amounts of pollutants like PM2.5, the culprit in skies tainted by wildfires in summer.

"This project had exemplary communication between owner, builder, and architect, so there were no 'lessons learned' resulting from lack of coordination or miscommunication," Bassett-Dilley says. "The entire team is proud to have tackled this challenging project and proved that even an old house can meet historic preservation criteria while meeting and exceeding 21st century goals for quality, energy efficiency, and resilience." **GB**



Out of gas. Hunters Point kitchens feature all-electric appliances, including the dishwasher, refrigerator, range and microwave.



Sun sense. An independent solar-powered grid provides the development with electricity regardless of weather mishaps.



Electric intelligence. The SonnenBatterie energy storage system interacts with solar panels to create an independent home power grid.

Storm Centurion

Thanks to green, forward thinking, the Hunters Point community thrives during natural disasters while others don't.

BY ALAN NADITZ

Hurricanes cause billions in damage each year, leaving a wide path of destruction in their wake. Florida residents know that situation all too well, especially when the state was hit by category 4s—Helene and Milton—three weeks apart in fall 2024. An earlier category 1—Debby—had also struck the area in August.

Homes and businesses everywhere were destroyed or critically damaged. But Hunters Point, an 86-home community in the commercial fishing village of Cortez along the Florida Gulf of Mexico coastline, went relatively unscathed thanks to forward-thinking, environmentally resilient construction.

According to Marshall Gobuty, president and founder of the project's developer, PEARL Homes, this post-natural disaster result is nothing new. "Thanks to our innovative design team, these homes are strong enough to withstand category 5 hurricanes," he notes. "So far, they have been put to the test after withstanding four hurricanes in the last two years."

After Helene and Milton, which combined caused more than \$65 billion in property damage, along with mass flooding and hundreds

of deaths, more than 3 million Florida residents were left without power. The lights stayed on at Hunters Point, and homes and streets did not flood.

Gobuty says the community's resilience comes from features such as using solar power as its primary energy source, hurricane-proof windows and doors, and streets intentionally designed to flood to prevent it from happening to the homes.

A Cortez resident, Gobuty watched Milton make landfall. He somewhat marveled at the 18 inches of horizontal rain to hit the area in 90 minutes and feared for the area's other residents as winds exceeded 130 miles per hour. But in the aftermath, he had to chuckle a bit: "The only thing that really got damaged was our coconut trees."

BUILT TO LAST

Much of Hunters Point's construction was based on common sense. Power and internet lines were buried to avoid wind damage. Homes featured sturdy, solid concrete walls. And hurricane-proof windows and doors were fortified with a layer of foam insulation, providing extra safety against the most violent storms.

Project Stats

NAME: Hunters Point PEARL Homes and Marina, Cortez, Florida

BUILDER: Marshall Gobuty, Pearl Homes Development LLC

ARCHITECT/DESIGNER: BSB Design, Inc - Tampa

DEVELOPER: Cortez Road Investments and Finance Inc (CRIF) LLC

LANDSCAPE ARCHITECT: Robert C. Gause, Gause and Associates, Inc.

INTERIOR DESIGNER: EMCY Design

PHOTOGRAPHER: PEARL Homes

From the Judges

"This is a model for resilient construction that should appeal to anyone who witnessed the destruction caused by Hurricane Helene"



Building blocks. To protect against flooding, homes are built 16 feet above sea level. At garage level, block walls contain continuous rebar to provide reinforcement in case of extreme weather conditions.



NATURAL DEFLECTION.
The home includes impact-resistant windows and doors designed to withstand hurricane force winds and better reflect outside heat.

MECHANICAL BREEZES.
ENERGY STAR certified ceiling fans help keep air quality and indoor temperature at optimal levels.

BRIGHT THINKING.
LED lighting provides low-cost, long-lasting household illumination.

MOISTURE-READY FLOORING.
Although not inherently "green," in this climate, PVC-based luxury flooring makes sense because it can withstand high humidity and has long-term durability.

CREDIT: COURTESY OF PEARL HOMES

Because the town of Cortez is on a floodplain, and to make Hunters Point dwellings hurricane ready, PEARL Homes built them 16 feet above sea level. There was also an increase in footing dimensions to accommodate a monolithic foundation. The garage level's block walls contain continuous rebar to provide reinforcement from the footing to the top of the masonry walls and are filled solid with concrete.

"We eliminated stack block foundation walls because they have little resistance to flood waters and hurricane wind loading," Gobuty notes. "We engineered framing with 2-by-6 stud walls in place of 2-by-4s to help with wind resistance, and incorporated 2-by-6 interior shear walls and ZIP panels on framed levels of the building to act as interior walls with stiff backs to resist wind loading.

All elevated framed structures are reinforced with metal connectors from the concrete/masonry walls to the roof trusses."

The insulation consists of sprayed foam that fills all exterior surfaces, adding a level of strength as well as insulation. Then, taped zip 5/8-inch-thick panels were added, along with James Hardie plank siding. More than 70 tons of concrete and masonry were used to anchor the structure and help it resist pressure in the environment.

CERTIFIED SUCCESS

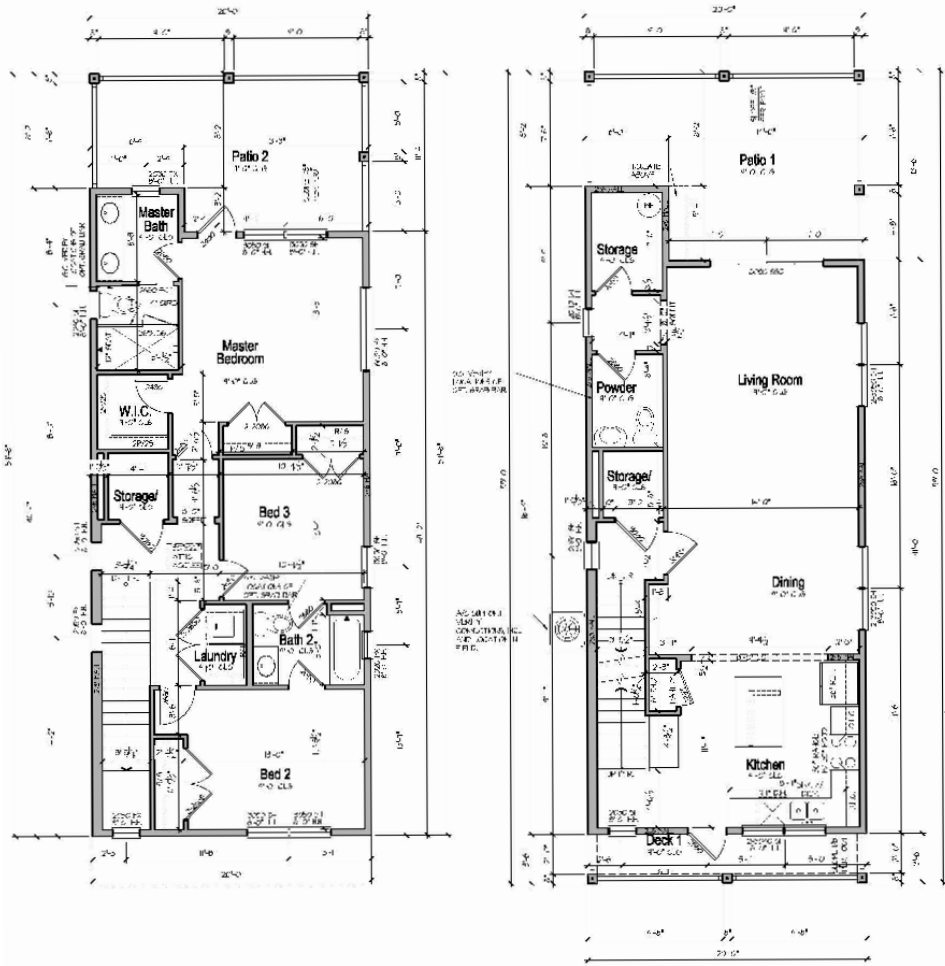
Hunters Point is the first U.S. Green Building Council (USGBC) LEED Zero-certified sustainable community in North America, and one of only three in the world. LEED Zero, a newer complement to the USGBC's LEED program, verifies the achievement of

net zero goals in existing buildings.

With the help of the Florida Solar Energy Center at the University of Central Florida, PEARL Homes engineered houses that outperform expectations. "Originally, we set out to make each home carbon neutral," Gobuty notes. "Instead, our models now generate 35 percent more power than we ever imagined, while consuming 25 percent less energy."

Each home's HERS score of minus 11 means it is reducing emissions and actively making a positive environmental impact by cutting carbon output by 8 tons annually, Gobuty adds. Each house can operate entirely off the power grid through use of the sonnenBatterie, an intelligent energy storage system that in combination with solar panels creates an independent

FLOOR PLAN



Upper Floor Plan

Main Floor Plan

power grid. Homes also feature an electric vehicle charging station in every garage, and the houses are (not surprisingly) all electric.

Hunters Point is the first development of its kind to offer this level of energy independence, Gobuty notes. For instance, in the event of a storm—such as hurricanes Helene and Milton—the local power grid is likely to fail and a vast majority of homeowners in Florida will face temporary outages of a few hours to days or even weeks.

As the recent storms proved, Hunters Point residents didn't experience that.

"Residents at Hunters Point have the peace of mind knowing that their homes are equipped with an intelligent backup power system providing clean, carbon-neutral energy," PEARL Homes notes.

The company notes that the homes are built primarily with materials that are sustainably

sourced and recycled, using a process specifically designed to reduce construction site waste. HVAC equipment utilizes non-global warming refrigerants, and ENERGY STAR appliances do not incorporate any fossil fuels for heating or cooking.

Homes also feature Broan-Nutone's Overture, a fully automated fresh air system with smart sensors that automatically detect temperature, humidity, total volatile organic compounds (TVOCs), PM2.5 and CO₂ to help control indoor air quality.

"Luxury should never come at the expense of the planet," Gobuty says. "Hunters Point is showing the world what's possible when you commit to responsible, future-focused development. This isn't just a collection of homes. It's a blueprint for the future of coastal living." **GB**

"So far, these homes have been put to the test after withstanding four hurricanes in the last two years."

—Marshall Gobuty, president,
PEARL Homes

Key Components

APPLIANCES: ENERGY STAR GE appliances: dishwasher, refrigerator, washer (with stainless steel braided hoses), dryer, kitchen range and microwave

BUILDING ENVELOPE: HERS Index score: minus 11

CABINETS, SHELVES, MILLWORK: Timberlake Cabinetry: KCMA Environmental Stewardship Program, AHMI Verified Sustainable, NAHB Green Approved

CAULKS AND SEALANTS: GE advanced silicone caulk, DAP Alex Plus caulk

CERTIFICATIONS: LEED Platinum, LEED Zero Energy, EPA WaterSense, EPA Energy Star, EPA Indoor AirPlus, DOE Zero Energy Ready Home (ZERH)

COUNTERTOPS: MS International Inc. *Q Premium* natural Quartz GREENGUARD certified

DECKS: Duradek vinyl waterproof decking

DOORS AND HARDWARE: Masonite solid core wood interior doors, Therma-Tru exterior impact-rated doors

ELECTRICAL: Energy Star certified new home, ceiling fans and exhaust fans; U.S. Department of Energy (DOE) ZERH certified

EXTERIOR FINISHES: James Hardie *Cedarmill* plank siding

FIRE PROTECTION: CO₂ and smoke detectors hardwired with battery backup throughout home

FLOORING: Shaw luxury vinyl plank flooring

GARAGE DOORS: BANKO impact-rated garage doors

HOME CONTROLS: Low-voltage wiring, door sensors, speaker system, IQ panel, outdoor cameras, doorbell with camera, one-year free monitoring alarm system

HVAC/DUCTS: Mitsubishi split system 15k BTU, Indoor AirPlus Qualified Home Duct leakage to outdoors 0.0 CFM25 per 100 square feet

INSULATION: ICYNENE Greenguard spray foam, open cell

LANDSCAPING: Florida Friendly Pervious Landscape

LIGHTING: LED lighting

PAINTS AND STAINS: Sherwin-Williams zero VOC paint

PLUMBING/PLUMBING FIXTURES: Moen WaterSense fixtures, Moen Flo Smart Water Monitor and Shutoff, WaterSense toilets

RENEWABLE ENERGY SYSTEMS (SOLAR, WIND, ETC.): sonnenBatterie ecoLinx solar energy storage

ROOF: Standing seam aluminum roof

TELECOMMUNICATIONS: Spectrum Underground

VENTILATION: Broan-NuTone *Overture* fresh air system

WATER HEATING: Electric 40-gallon water heater

WINDOWS, SKYLIGHTS, PATIO DOORS: PGT impact-rated low E windows



From the Judges

"Red Tree does a nice job of merging luxury with sustainability."

PHOTO COURTESY OF RED TREE BUILDERS/KRISTY KEPLEY-STEWART



Natural Wonder

Red Tree Builders' latest award-winning effort is a 'Green Haven' in more ways than one.

BY ALAN NADITZ

There's nothing like starting things out right. Red Tree Builders-Alair Asheville's Green Haven project in Asheville, North Carolina, could have been another run-of-the-mill residential housing development with a generic floorplan and average energy efficiency features. But Red Tree and the rest of the development team—architect Olivette Riverside Community and Farm, landscape architect Knight Strategies, designer RT Design, and structural engineer Dunn Structural Engineering—used a unique outdoor environment to create an even more unique home.

The all-electric home is part of the Olivette Riverside Community and Farm in Asheville's first "agrihood"—a place with a working farm maintained by residents—and 1.5 miles of French Broad River frontage. Its inclusion as a winner in Green Builder's 2025 Green Home of the Year awards makes it two honors in a row for Red Tree Builders.

The 2,618-square-foot home includes three bedrooms, two full bathrooms, and two powder bathrooms. Certified Department of Energy (DOE) Zero Energy Ready, Indoor AirPlus, and ENERGY STAR, it exemplifies high-performance sustainability, according to Brandon Bryant, president and owner of Red Tree Builders-Alair Asheville.

Project Stats

NAME: [Green Haven](#), Asheville, North Carolina

BUILDER: Brandon Bryant, [Red Tree Builders-Alair Asheville](#)

ARCHITECT: [Olivette Riverside Community and Farm](#)

DEVELOPER: [Olivette Riverside Community and Farm](#)

INTERIOR DESIGNER: Gina Taterus and Anna Hibbits, [RT Design](#)

LANDSCAPE ARCHITECT: Mary Webber, [Knight Strategies](#)

STRUCTURAL ENGINEER: [Dunn Structural Engineering](#)

PHOTOGRAPHER: Tim Burleson, [Tim Burleson Photography/The Frontier Group](#); Kristy Kepley-Steward, [Red Tree Builders](#)



ABOVE:

Counter points. Kitchen and bath countertops throughout the home are made of long-lasting, easily maintained, naturally sourced granite and quartz. CREDIT: TIM BURLESON PHOTOGRAPHY/THE FRONTIER GROUP/TIM BURLESON

RIGHT:

Sensible H₂O. Water for bath, shower and other fixtures throughout Green Haven are powered by an all-electric water heater, which helps to give the house a HERS score of minus 6. CREDIT: TIM BURLESON PHOTOGRAPHY/THE FRONTIER GROUP/TIM BURLESON



Smart space. Living areas feature vaulted ceilings, which help provide natural lighting, while white oak flooring is geothermally maintained as needed.

CREDIT: TIM BURLESON PHOTOGRAPHY/THE FRONTIER GROUP/TIM BURLESON



Key Components

APPLIANCES: Bosch Refrigeration 800 Series French door bottom mount refrigerator 36-inch, easy clean stainless steel]; *Wolf Cooktop* 30-inch contemporary induction cooktop; *Vent-a-Hood Ventilation*; Oven 1: Miele Wall Oven 24-inch DGC 7865 XXL *Pure Line*, plumbed Combi-Steam Oven; Oven 2: Miele wall oven 24-inch H 7240 BM *Contour Line* speed oven; Miele dishwasher G 7366 SCVi 24-inch fully integrated dishwasher; Zephyr refrigeration 24-inch French door dual zone wine and beverage cooler; Scotsman refrigeration 30-pound gourmet ice machine; Miele WXF 660 WCS washing machine; Miele Dryer TXI 680 WP heat pump dryer

BUILDING ENVELOPE: 2-by-6 walls; open cell foam insulation (full envelope); 2-inch foam slab insulation; ZIP System sheathing (wall and roof); rainscreen; thermally modified wood siding

CABINETS, SHELVES, MILLWORK: Cabinets: combination of Starmark and Wellborn Premier lines

CAULKS AND SEALANTS: ZIP Quik-Flash

COUNTERTOPS: Kitchen: Quartz *Calacatta Nuvo* and Quartz *Frosty Carrina*; Wet bar, primary bath and powder bath: Granite *Negresco*; Lower utility and guest bath: Quartz *Artic White*

DOORS AND HARDWARE: Interior doors: *Masonite Riverside* solid core; Door hardware: *Baldwin L022 Matte* black; Pantry door: White Oak; Entry door: *Rogue Valley Species Fir*; Slider doors: *Anderson Lift N Slide*; Electrical: 200A SPAN load management smart load center; EV charging plug; Exterior finishes: Soffit T&G exposed rafter tails, Fascia, water table, band trim, freeze board, trim around windows and door: SW 3001 Shag bark; Siding: *Thermory Clear Pine* with Chestnut stain; Beams, brackets, posts: Cedar with clear coat trim around doors and windows, SW 3001 Shag-bark

FIRE PROTECTION: Code compliant smoke detectors

FLOORING: Symphony Rondo 9-1/2 inch x 5/8-inch x 82-5/8 inch RL engineered hardwood

GARAGE DOORS: Haas *American Tradition* color Ash

HVAC/DUCTS: Water furnace geothermal heat pump, with vertical wells; Sheet metal hard duct trunk lines; Honeywell steam humidifier

INSULATION: Open cell (ceiling R-26, floor R-30, walls R-19, Slan R-10)

LANDSCAPING: Rain garden for stormwater

LIGHTING: *Dark Sky Compliant* exterior lighting; 100 percent LED lighting

PAINTS AND STAINS: Sherwin Williams *Super Paint Air Purify*; Walls: SW 9622 *White Sale*; Trim: SW 7005 *Pure White*

PLUMBING/PLUMBING FIXTURES: Kitchen: Blanco *Silgranit* sink, Delta *Trinsic* faucet matte black; Wet bar: Blanco *Silgranit* sink, Delta *Trinsic* faucet matte black; Powder bath: Signature Hardware hammered copper vessel sink, Delta *Trinsic* faucet matte black, Toto toilet *Eco Ultra Max*; Primary bath: Kohler *Ladena* sink, Delta *Ara* widespread faucet matte black, Delta *Ara* shower trim matte black, Delta *Pivotal Hand Shower* matte black, Signature Hardware *Patera* soaking tub, Delta *Ara* floor mount tub filler, Toto *Ultra Max Toilet* with washlet; Utility room: Kraus stainless sink, Delta *Lenta* faucet brushed nickel; Guest bath: Kohler *Ladena* sink, Delta *Ara* faucet matte black, Delta *Ara* shower trim matte black, Toto *Eco Ultra Max* toilet; Bath 4: Toto *Eco Ultra Max* toilet, Delta *Shlyn* faucet matte black

RENEWABLE ENERGY SYSTEMS (SOLAR, WIND, ETC.): 12.15 kWp PV; Enphase IQ8 microinverters, Enphase IQ Combiner 5, Enphase IQ System Controller 3G, Enphase IQ Battery 5p (4 units)

ROOF: Metal Panel Style: Standing seam profile; Striated thickness: 26 gauge fastening method; Nailstrip metal panel; Color: Bronze

VENTILATION: Broan *Overture* system including wall controls for wet areas, room sensor (1 each level); Smart plug for ERV; Exhaust fans; Powder: Broan *AE110K*, Primary bath: Broan *AE110K*; Primary bath: Broan *AR110LKVV*; Guest bath: Broan *AE110K*; Lower guest bath: Broan *AE110K*; Garage: Broan *AE110K*; ERV: Broan *160E65RS*; Dehumidifier: Honeywell *DR65A3000*

WATER HEATING: 3.8 UEF Rheem *Performance Platinum* 80-gallon, 10-year *Hybrid High Efficiency Smart Tank* electric water heater; Grundfos recirculation pump with aqua-stat; Full hot water recirculation plumbing loop

WINDOWS, SKYLIGHTS, PATIO DOORS: Andersen *E Series*, Andersen *Liftslide*

SOLAR ASSISTANCE

A solar power system enables the home's heating, appliances, and operating systems to run on clean energy.

DAMAGE RESISTANT.

The home's exterior is clad in thermally modified wood, which is resistant to fungus, decay, termites, dry rot, and mold.

UPON REFLECTION.

Tailor-made windows offer a unique appearance and reflect excessive heat.

"This was the first custom home built among 20 lots in this neighborhood, so while we adhered to established guidelines for the riverfront community, the goal was to create a home that felt truly unique while blending seamlessly with its surroundings," Bryant notes. "The real inspiration came from the peace and tranquility of the community overlooking the French Broad River, while also meeting the performance desires of our client. We designed the home to capture that serenity, crafting intentional moments on every level that reflect the homeowners' lifestyle and enhance their connection to the natural beauty around them."

THE SMART PANEL—A WISE CHOICE

Designed for energy efficiency and future adaptability, Green Haven's infrastructure is entirely electric. Boasting a HERS score of minus 6, the home produces more energy than it consumes, courtesy of items such as geothermal heating and cooling, and solar photovoltaics.

A battery storage system allows homeowners to bypass selling excess energy to the grid and instead opt to store power for electric car charging and emergency needs, ensuring resilience and self-sufficiency.

Central to this achievement is the [SPAN Panel](#), a smart electrical panel that allows a homeowner to control and monitor every circuit in the house via smartphone or tablet, and help them understand how the home is sourcing, storing and using energy in real time.

Span Panels optimize power distribution, enabling the home's heating, appliances, and operating systems to run on clean energy. The panels seamlessly integrate with solar power and battery backup. Also, the system prioritizes essential functions during outages, enhancing the home's resilience and energy efficiency.

This latter benefit proved very handy in late September 2024, just a couple months after Green Haven's completion, when Hurricane Helene struck the area. While



NATURAL BOND.

Expansive two-story decks foster an indoor-outdoor connection, which can provide homeowners with a positive and peaceful state of mind.

“The homeowner’s expectations for efficiency and resilience added layers of complexity...it allowed us to push the boundaries of what’s possible in high-performance, sustainable homebuilding.”

—Taylor Bennett, project manager, Red Tree Builders-Alair Asheville

homes elsewhere suffered severe damage and were without power for days or weeks, Green Haven remained fully functional.

“The systems we implemented to make this home sustainable, durable, and resilient were put to the ultimate test—and they delivered,” Bryant says. “From the rain gardens to the solar panels with battery backup, every feature worked as intended.”

SUSTAINABLE RESOURCES OUTSIDE AND IN

The exterior is clad in durable **Thermory** thermally modified wood, while large **Renewal by Andersen** windows provide ample natural light and passive solar heating. Expansive lift-slide doors and two-story decks foster an indoor-outdoor connection, offering views of the French Broad River.

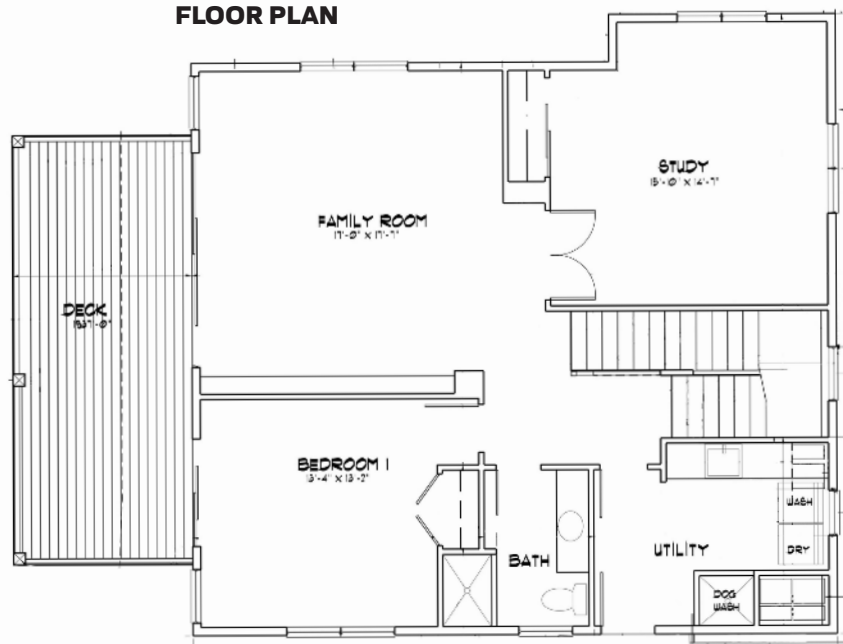
Inside, the open-concept kitchen, living, and dining areas feature white oak flooring and vaulted ceilings. Custom cabinetry, a large center island, and French doors leading to a hidden pantry elevate the kitchen, while the living room is anchored by

a modern floor-to-ceiling fireplace with a water vapor display, serving as an innovative focal point.

Other features include a **Rheem** heat pump water heater, **Broan** energy recovery ventilator (ERV) and bath fans, Broan’s **Overture system** for excellent indoor air quality and ventilation, and Energy Star-certified appliances.

Installation of vertical geothermal wells—which provide natural, money-saving indoor temperature control to the inside of the home—became a happy-ended construction lesson, according to Red Tree Project Manager Taylor Bennett. “The installation process can release significant amounts of groundwater, and it was crucial to manage this onsite to prevent runoff into the French Broad River,” he says. “To address this, we utilized temporary detention ponds to capture groundwater and silt expelled during drilling. These ponds were then thoughtfully converted into a permanent rain garden for stormwater detention, combining environmental responsibility with lasting functionality.” **GB**

FLOOR PLAN



CREDIT: OLIVETTE RIVERSIDE COMMUNITY AND FARM



Honorable debut. The Bell Residence is the first home in Michigan to receive a Passive House Institute U.S. (PHIUS)+ Zero certification.



Sustainably minded siding. The home's exterior includes R-54 insulation in the walls and non-VOC paint on them.



ALL PHOTOS COURTESY OF RYAN HALSEY PHOTOGRAPHY/RYAN HALSEY

Certified Special

The Bell Residence, a unique PHIUS Passive House, demonstrates how easy reaching net zero carbon emissions can be. **BY GREEN BUILDER STAFF**



When you're the first at something, you also set an example. Fireside Home Construction and Architectural Resources have accomplished that with the Bell Residence in Birmingham, Michigan, a Passive House Institute U.S. (PHIUS)+ Zero 2021 Passive House, the area's first such certified home, and the first pre-certified PHIUS+ 2021 home worldwide.

This home features a rainwater harvesting system, complete with rain gardens, and a grid-tied solar electric (photovoltaic [PV]) system, which allows it to operate fully on electricity. It also boasts Michigan's best air-sealed and tightest building envelope, which is paired with a state-of-the-art Zehnder ERV whole-house ventilation system to maintain superior indoor air quality (IAQ).

Project Stats

NAME: Bell Residence, Birmingham, Michigan

BUILDER: Jake Lappan, [Fireside Home Construction LLC](#)

ARCHITECT: Michael Klement AIA, [Architectural Resources LLC](#)

LANDSCAPE ARCHITECT: Shannan Gibb Randall, [Insite Design Studio](#)

PHOTOGRAPHER: Ryan Halsey, [Ryan Halsey Photography](#)

From the Judges

"This project would appeal to other homeowners who are looking for a high-performance custom home, especially if they have a large budget."



Power misers. Appliances and lighting throughout the house are ENERGY STAR rated.

Key Components

APPLIANCES: ENERGY STAR rated and Phius+ Zero rated Whirlpool, JennAir Sharp, Bosch, Zephyr, GE and Marvel

BUILDING ENVELOPE: Foundation: Insulated basement, R-54 total. R-22 ICFs: 5-inch EPS plus 10-inch concrete core. On interior: 2-by-4 24-inch o.c. wall dense-packed with blown fiberglass. Exterior: Self-adhered waterproof membrane, 2-inch rigid XPS, 3/8-inch stucco. Walls: Double wall, R-49 total: Two 2-by-4 walls, 24-inch o.c., set 8 inches apart, dense-packed fiberglass in cavity, ZIP System sheathing with all seams, joints, and fasteners taped and sealed with ZIP liquid flash, plastic mesh rainscreen, fiber cement siding. Attic: Vented, 30-inch R-120 blown-in cellulose, 36-inch to 48-inch raised-heel trusses. From interior: Drywall; 2-by-4 service cavity; ZIP 7/16-inch OSB attached to bottom of truss chords. Air sealing: 0.23 ACH50; continuous air barrier, all joints taped and caulked; windows and door frames sealed with expanding foam tape, flashing tape, and sealants.

CABINETS, SHELVES, MILLWORK: Kitchen and bath cabinets: R.D. Henry & Co. Shelves/Built-ins: Poplar-built and finished on site. Millwork: Poplar and white oak

CAULKS AND SEALANTS: Titebond All-Weather Subfloor Adhesive, 100 percent silicon, OSI Quad, ZIP Liquid Flash, ZIP tape

COUNTERTOPS: Cambria Quartz

DECKS: Screened porch: Concrete slab. Hardscaping: Bluestone and pavers.

DOORS AND HARDWARE: Exterior doors: Mavrik European doors with Mavrik hardware. Interior doors: Poplar 1-3/8 inch 2-panel painted Karona doors with Kwikset *Balboa Lever* hardware

ELECTRICAL: Square D Homeline 200 Amp panel and breakers and Cat6 data lines.

EXTERIOR FINISHES: Siding: Pre-finished James Hardie lap and board and batten siding. Trims, Wraps, and Fascia: Primed Boral screwed, plugged and painted onsite. Soffits: primed Boral beadboard and painted on site.

FLOORING: 3-1/4-inch white oak finished on-site main living areas, tile at all bathrooms, LVT, sports flooring and carpeting on stairs

GARAGE DOORS: Coachman *Premium* series with 4-layer *Intellicore* insulation, R value 18.4 with 87504-267 *WIFI DC* belt drive with integrated camera and backup battery

HOME CONTROLS: Heat pump water heater, indoor air quality monitor, HVAC, ERV and range hood ventilation, *Sol-Ark* 15K solar/battery system, and overhead garage door openers that are smart home/Wi-Fi enabled and controlled. The whole house hot water recirculation system is user activated.

HOT WATER: 80-gallon A.O. Smith *Voltex Hybrid* electric heat pump water heater, 4.07 COP demand recirculation.

HVAC: Mitsubishi ducted mini-split heat pumps; 10.4 HSPF, 18.4 SEER, 3 air handlers, 3 outdoor compressors. Cold-climate heat pumps.

INSULATION: Foundation – Below slab: R-17.5 – Walls: R-54. Above grade walls: R-49 A2c (vented): R-120

LANDSCAPING: Raingardens and hardscaping designed by In-Site Design Studio, Inc.

LIGHTING: Energy Star rated

PAINTS AND STAINS: Benjamin Moore: All zero VOC

PLUMBING/PLUMBING FIXTURES: All *Waterwise*: Kohler, Grohe, Delta

RENEWABLE ENERGY SYSTEMS (SOLAR, WIND, ETC.): Cistern system to harvest rainwater, solar 21 kW, 45.6 kWh batteries

ROOF: Gable truss roof, OSB, self-adhered underlayment, standing-seam metal roofing.

VENTILATION: Zehnder ERV, separately ducted supply and return to each room; boost buttons in baths and kitchen; humidifier and dehumidifier on sensors; IAQ sensors

WINDOWS: Mavrik European windows, *Imperial Plus* series, triple-pane windows, Tilt-Turn – U=0.16, SHGC=0.50, low-e, argon-fill. Passive House rated, dynamic glazing.



Nature at rest(rooms). Quartz countertops and poplar-based cabinets in the bathrooms are naturally sourced.

Additionally, this home integrates advanced smart panel technology with PV system, giving its homeowners detailed control and monitoring over all aspects of their electrical infrastructure.

The PHIUS+ 2021 standard that this home meets is designed to reduce energy for space conditioning by 40-60 percent compared to conventional buildings. PHIUS+ homes are known for their high performance, offering improved (IAQ), resilience during power outages, and an exceptionally quiet, comfortable indoor environment.

At the core of the passive building methodology are design principles that balance energy gains and losses based on climate to achieve unparalleled energy efficiency and comfort. Passive design strategies include continuous insulation without thermal bridging, high-performance windows, balanced heat and moisture recovery ventilation, and an ultra-minimal space conditioning system.

“A passive building achieves comfort through superinsulation and airtight construction, keeping indoor temperatures consistent and minimizing energy demand,” the companies note. “The approach applies across building types, from single-family homes to skyscrapers, making it a versatile solution for high-performance building.”

NET ZERO CARBON: A PLEASANT SURPRISE

The Bell Residence was designed for high performance under PHIUS standards, and although achieving net zero carbon emissions wasn't the primary goal, strategic use of advanced building science resulted in a

remarkable **RESNET** Carbon Index score of minus 22, according to Fireside Home Construction President Jake Lappan. This was achieved through a combination of climate-specific design, thermal mass utilization, precise envelope optimization, and material choices that ensure energy conservation and carbon reduction throughout the building's lifecycle.

Multiple advanced strategies to achieve net zero carbon and surpass typical standards were implemented, including:

AIRTIGHT CONSTRUCTION

The Bell Residence holds the record for the tightest air sealing in Michigan, which drastically reduces energy loss and optimizes overall efficiency. Minimizing air leakage reduces heating and cooling loads, which conserves energy throughout the home's lifecycle.

SUPERIOR INSULATION AND THERMAL BRIDGING MINIMIZATION

Continuous insulation was applied across the building envelope, eliminating thermal bridging and creating a barrier that maintains interior temperatures. This approach conserves energy year-round, allowing for precise climate control and energy savings.

ONSITE RENEWABLE ENERGY

The home's highly efficient, grid-tied PV system exceeds net zero energy requirements. The system offsets all household energy needs and provides surplus energy, which powers an electric vehicle (EV) charging station,



FINE FINISHES.
Cabinets, walls and the ceiling are finished with non-VOC paints, helping to reduce chemical emissions within the home.

INTEGRAL EFFICIENCY.
ENERGY STAR-certified appliances are effective at reducing power usage and conserving resources, such as water and ice dispensed from the refrigerator via a water line.

SILENT TREATMENT.
Triple-pane glass windows are extra efficient in controlling the passage of cold, heat and noise into the house.

SOLID AS A ROCK.
Naturally sourced quartz countertops in the kitchen are durable, attractive and easy to maintain.



Low lights. Low energy consumption lighting throughout the house helps generate a less-expensive electric bill.

further lowering the carbon footprint and eliminating emissions from transportation.

VENTILATION SYSTEM FOR INDOOR AIR QUALITY AND ENERGY EFFICIENCY

The home utilizes a Zehnder Energy Recovery Ventilation (ERV) system, which ensures optimal (IAQ) by continuously exchanging fresh, filtered air. This ERV also recovers heat and moisture, reducing the demand on the heating and cooling system while maintaining comfortable indoor conditions.

EFFICIENT ENERGY MANAGEMENT

Smart panel technology integrates with the solar system to enable precise monitoring and control of all electrical infrastructure. This system optimizes energy usage in real time, which helps maintain a HERS score of minus 20 and RESNET score

of minus 22, which reflects the home's carbon-negative performance.

Lifecycle-based material selection. "While we didn't quantify embodied carbon, our material choices were made with lifecycle impact in mind, focusing on durability and low embodied carbon materials like engineered wood and cellulose insulation," Tappan notes. "These decisions were guided by research on material sustainability and aligned with minimizing embodied carbon."

QUALITATIVE ANALYSIS FOR CONSTRUCTION EFFICIENCY

Throughout the project, Fireside Home Construction and Architectural Resources employed resource-efficient construction methods, such as waste minimization and local sourcing, which are generally associated with lower carbon impacts. **GB**



ALL PHOTOS COURTESY OF ZACHARY DAVIDSON FOR UNITY HOMES

Wild and Free

For the owners of Unity Homes' Nano Bas project, their big dream came in a small package.

BY DAMARIS GRAHAM

Angie and Matt dreamed of having their own small home in Vermont. They initially wanted to buy an existing home and avoid building new. However, they discovered that most available homes were too large, expensive to heat and cool, hard to maintain, and not very energy efficient.

Given Vermont's unpredictable weather, Matt and Angie wanted a resilient home capable of

withstanding storms, extreme temperatures, and even occasional tornadoes. It needed to be an energy-efficient dwelling that would save them money in the long run. And, since they both planned to retire soon, it needed to be easy to maintain.

There were personal preferences, too. Angie desired a single-level home to age in place comfortably. Matt's asthma and sensitivity to

Project Stats

NAME: [Living Big in a Unity Nano](#), Worcester, Vermont

BUILDER/ARCHITECT: [Utility Homes](#)

PHOTOGRAPHER: Zachary Davidson for Unity Homes;
Angie Romero

From the Judges

"This home is an excellent example of sustainable living in a small space."



Weatherproofed. The *Nano Bas* home includes a high-performance wood shell designed to safeguard the house against extreme weather.



Natural framing. The house features weather-resistant windows and walls made of carbon emissions-capturing wood.



ELECTRIC WITH EASE.

Power-saving appliances contribute to the Nano's low operational energy requirements.

EASY CHOICE.

Choosing an all-electric house vs. one powered by natural gas helps reduce carbon emissions inside the home.

AIR AWARE COATINGS.

Paints used throughout the home are non-toxic and low-volatile organic compound (VOC).

OPEN BY DESIGN.

An open kitchen, dining and living area design makes the home feel much larger than its sub-600-square-foot size..

chemicals meant the home needed minimal off-gassing and low volatile organic compounds (VOCs).

After an extensive land search, Angie and Matt discovered an 81-acre property for sale in Worcester, Vermont, adjacent to a state forest with mountain views. Despite its challenges, such as a long, narrow driveway with overhanging trees, overgrown brush fields, and an old hunting cabin that wasn't fully enclosed, the opportunity to live sustainably surrounded by nature made the site worth purchasing.

BIG GREEN IN A SMALL PACKAGE

When searching for a high-performance builder, the couple discovered Unity Homes. Matt notes that Unity's values and commitment to sustainable building practices "aligned with their own goals of minimizing their environmental impact."

Angie and Matt chose Unity's *Nano Bas*

home plan. This pre-engineered Nano design featured a single-level layout, vaulted ceilings, an optional screened porch, and a spacious feel within just 586 square feet. Matt appreciated that the design did not have structurally insulated panels (SIPS), but instead had Unity's standard panelized shell that allows for easy interior modifications—with a fully insulated outer shell made with all wood-based materials.

The *Nano Bas* home has a variety of sustainability features, many of which were dead-on with the couple's housing requirements. It is all-electric, net zero ready, and optimized for solar. Its small size means it has low energy requirements, maintains a steady temperature, and has predictable operating costs. The wood-based construction materials are carbon capturing. Walls use R35 insulation; the roof has R50. Paint is non-toxic and low-VOC. Hot water is supplied by a

50-gallon hybrid heat pump water heater. And the compact design made for minimal construction waste.

Each Unity home also features a balanced ventilation system that provides filtered fresh air and reduces indoor air pollutants, with carefully selected materials that meet the EPA's Indoor airPlus standards. This is a home that effectively manages moisture to prevent mildew, mold, and other allergens, something crucial for Matt's well-being.

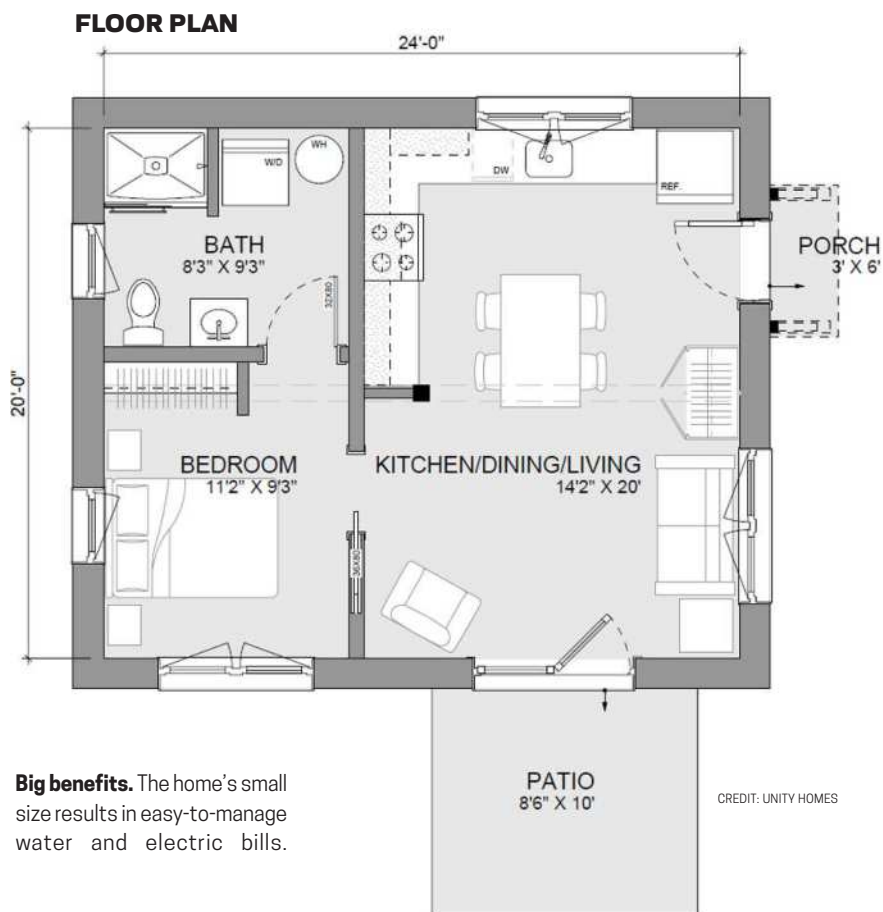
ROLL UP THE SLEEVES

Motivated to save money and maintain full control of their project, Angie and Matt embraced a DIY approach and acted as general contractors for their Nano. Harnessing her natural organizational skills, Angie managed construction as the main GC with guidance from Unity.

Typically, Unity provides clients with a list of general contractors, who handle



Hidden assets. Unity's homes feature R50 dense-packed cellulose insulation in the roof and R35 in the walls, for superior indoor heating and cooling.



the logistics and subcontracted work for site preparation and finishing touches. Unity, as the designer-builder, also guides all clients through the build process and provides all necessary permit plans, construction documentation, and checklists to ensure that each step proceeds in the correct order.

It can be difficult for experienced contractors to build a home. Homeowners taking on the GC role themselves face additional challenges—especially for homeowners without a construction background. But, in Angie's experience, "if you stay organized and are willing to research and ask questions, it is completely doable if you have time." She says she watched plenty of DIY videos on YouTube to enhance her skills, and made many phone calls to make sure she understood local regulations of details such as when the foundation could be poured.

Matt also honed his construction skills. Worcester does not require a homeowner to use a licensed electrician, which allowed

Matt to learn the code and do the electrical work himself.

They subcontracted some of the tasks, such as excavation, pouring the foundation, and adding an optional basement to the home. Once the site work was complete, the Unity team raised the prefabricated, fully insulated panelized Nano shell. It was up and weathertight in just four days. Angie and Matt later installed a solar field array with backup batteries in case of power outages.

They also chose natural interior finishes to limit off-gassing and chemical effects, using Vermont Natural Coatings products for the floor and ceiling finishes, installing copper pipes, and finishing their countertop with beeswax sealant.

As of summer 2024, the home was mostly complete. All major tasks, including rough-ins, siding, painting, and the installation of a small wood stove on the screened porch, have been accomplished. **GB**

Key Components

BUILDING ENVELOPE: Unity Homes panelized wall system: 9-1/2-inch I-joist framing, R35 dense pack cellulose insulation, interior oriented strand board (OSB) and exterior ZIP sheathing; Blower door-tested air tightness 0.93 ACH50.

DOORS AND HARDWARE: Main entry door: Rogue Valley 1 Panel Half Lite, Fir, Schlage Avila lever keyed entry lock

EXTERIOR FINISHES: Rough sewn hemlock

FLOORING: Kahrs Red Oak Nature

HVAC/DUCTS: Mitsubishi MUZ-FH18NAH2 air source heat pump, single zone wall cassette

INSULATION: Dense pack cellulose

RENEWABLE ENERGY SYSTEMS (SOLAR, WIND, ETC.): None yet, but planned solar

ROOF: Standing seam metal

VENTILATION: Zehnder HRV

WATER HEATING: State 50-gallon hybrid heat pump water heater

WINDOWS, SKYLIGHTS, PATIO DOORS: Triple-glazed Logic Tilt/Turn U-Factor 0.17, R Value 5.9, SHGC .24, VT 0.39

Honorable Mention

Here are four more homes worthy of a callout for sustainable design.



El Cofresito del Bosque Feliz

LOCATION: Rio Grande, Puerto Rico

BUILDER: Peter Medero

CATEGORY: Small Footprint

ARCHITECT: [Abruña & Musgrave, Architects](#)

This 96-square-foot Nano-Ecohouse was designed using 16 plywood modules that were prefabricated and easily assembled at the site by the gardener who tends the property. Bolts and screws were used so that the structure can be quickly disassembled for relocation. The foundation system consists of nine 5-gallon pails of concrete. The roof is insulated with EPS panels.

Tall window openings and double doors allow for natural daylighting and cross ventilation. A 50-gallon rainwater cistern supplies the minimal water requirements for the unit. The electrical system is based on independently installed solar lamps and a 500-watt battery charged through a USB plug and/or at the owner's permanent residence fitted with a photovoltaic system.

CREDIT: ABRUÑA & MUSGRAVE/FERNANDO ABRUÑA

Zero Energy SIP Apartments

LOCATION: Kansas City, Kansas

CATEGORY: General

BUILDER: [Tartan Residential Inc.](#)

ARCHITECT: [Urban Architectural Group](#)

The primary goal of this project was to create a highly energy-efficient complex, focusing on operational efficiency. Key to the 115-unit project's success were the innovative design and structural engineering techniques, including top chord-hanging trusses for the floors, to optimize Structural Insulated Panels (SIPs) as a core component of the exterior walls.

The use of 4.625-inch EPS core wall panels ensures excellent insulation and structural integrity. The energy efficiency of the buildings is highlighted by HERS scores of 45 for the 2-bedroom units and 47 for the 3-bedroom units, with an ACH50 rating of 1.75. Air source heat pumps provide efficient heating and cooling, and future solar panel installations are planned to achieve full net zero compliance.



CREDIT: TARTAN RESIDENTIAL INC./JEFF CARROLL



CREDIT: ZACHARY DAVIDSON FOR UNITY HOMES

Prefarm Net Zero Energy Värm

LOCATION: Biddeford Pool, Maine

CATEGORY: Off-Site Construction

BUILDER/ARCHITECT: [Unity Homes](#)

This project embodies sustainable luxury through its two connected residences. At the core of this property is a 30,000-gallon rainwater harvesting system, capable of capturing up to 6,000 gallons per inch of rainfall from the main residence, supporting irrigation, potable use, and gardens on the 11-acre property. Solar energy is generated by discreetly positioned ground-mounted photovoltaic panels. For energy independence and resilience, the home integrates its own well for fresh water, with the option to use city water. A Generac generator provides backup power.

A mudroom supports an eco-conscious lifestyle with a built-in water bottle filler that uses rainwater collected on the property. A guest home is designed for generational living, incorporating features that make efficient use of resources.

This home—Värm, or Scandinavian-inspired farmhouse design—was built to honor the architectural traditions of its neighborhood while creating an energy-efficient space where family could gather. It was prefabricated in Unity Homes' 100 percent solar-powered factory in Keene, New Hampshire. The site prep work and panel fabrication could be completed simultaneously, minimizing disruption to the neighborhood. The home's high-performance shell was then quickly raised on site and made weather-tight in just two weeks in April 2023.

With exposed timbers and European tilt-turn windows, the interior is filled with year-round light and warmth. It's also on its way to net zero: For the six-month period since the installation of solar panels, the owners used 2.7 MWh and sent 4.16 MWh back into the grid.

TX Hill Country Haven

LOCATION: Austin, Texas

CATEGORY: General

BUILDER: [Younger Homes](#)

ARCHITECT: [Danze & Davis Architects](#)



CREDIT: TIKCAM PRODUCTIONS/COLLIN KURIO

ONE WILD RIDE, SO FAR



Transcend, one of Green Builder Media's most popular prefab projects, is a net zero carbon, precision-engineered home in the majestic San Juan Mountains in Colorado.

GREEN BUILDER MEDIA'S JOURNEY

It has been a wild ride for Green Builder Media. We've cherished every moment, and we thank all readers, sponsors, colleagues and supporters for enabling our success. We fondly reflect on the milestones that led us to where we are today.



Ron Jones and Sara Gutterman incorporate Green Builder Media. The journey begins!!



The first issue of **Green Builder magazine** is released at the International Builders Show (IBS) in Las Vegas—proof that what happens in Vegas doesn't always stay there.

2005

2006

2025 is Green Builder Media's 20th anniversary. So much has changed in the past two decades as the green building market, and Green Builder Media along with it, has evolved from niche to mainstream.

BY SARA GUTTERMAN

When I reflect on the past 20 years since Green Builder Media's inception, I can hardly believe the amount of change that has taken place.

From an organizational standpoint, we started with Green Builder magazine. Back then, if we wanted the industry to listen, all we could really talk about was energy efficiency, building science, and cost savings from energy efficiency and building science.

Today, we have evolved into so much more. Not only have we broadly expanded our offerings to include a wide spectrum of content marketing and media services, VISION House demonstration projects, comprehensive annual programs like Housing 2.0 (builder training) and Today's Homeowner (consumer education), COGNITION Smart Data (market insights), and sustainability consulting (wow, that's a lot!), we've also had the unique privilege of playing an important role in transforming the building industry.



VISION House Albuquerque—a custom home with Sun Mountain Construction— wins the top prize in the Land of Enchantment Parade of Homes, and the National Association of Home Builders (NAHB) annual award for Best Green Home.



Ron wins a Green Building Professional Lifetime Achievement Award from NAHB.



Mariposa Meadows, an off-grid, resilient, and carbon neutral compound nestled into millions of acres of national forest in the stunning San Juan Mountains of Colorado, is one of the crown jewels in Green Builder Media's VISION House program.

REFLECTIONS ON TRANSFORMATION

Green Builder Media was originally conceived by our president, co-founder and North Star Ron Jones, who had the foresight to secure the trademark Green Builder® in 1996. Ron is considered to be one of the founding fathers of the green building movement here in the U.S. In 2005, when we started the company, his long and storied career as an award-winning green builder brought us immediate credibility.

In the beginning, it wasn't always easy. In fact, the first decade was downright hard. It's challenging to build something out of nothing, and there were plenty of headwinds for a company like Green Builder Media, a small, feisty team that insisted on nothing less than market transformation.

We endured blow after blow in the early years: Industry leaders erroneously claiming that green was a fad. Competitors fallaciously reporting that we were going out of business. The world not listening

as closely as we wanted them to—no, as closely as we needed them to.

Some would say that it was a stroke of pure luck that we survived the 2008 recession, which pummeled the building and publishing industries. That was a challenging time, but we pivoted, dipped, tucked and rolled with the punches, constantly innovating and adapting to new technologies, evolving consumer demand, and shifting industry dynamics.

Perhaps what I'm most proud of is that even during the darkest moments, we have remained steadfastly true to our mission to build a better world. That has been the real secret to our success. Year by year, our voice got louder, our network grew, and our influence expanded.

For two decades, we have evangelized that energy efficiency is paramount to reducing monthly utility bills and saving homeowners money; that smart technologies save resources and enhance indoor air quality by optimizing the operation of our homes; and that healthy homes are essential to improve occupant comfort and wellbeing.

GREEN BUILDER MEDIA'S JOURNEY



Cati O'Keefe and Matt Power join the team and the real fun begins!

VISION House St. Louis, a small infill community of five homes in Kirkwood, Missouri, is built for National Green Building Conference.

Green Builder College launches. This is a precursor to COGNITION Academy.



2007

2008



ReVISION House Scottsdale is a deep-energy, healthy, pandemic-proof retrofit that takes an energy inefficient home and turns it into a high-performance masterpiece!

VISION House Orlando, a high-end architect-designed custom dwelling built by Westmont Homes built for the IBS, wins the top prize in the Orlando Parade of Homes.

The Sustainable Home of the Year awards program launches.



Craig Coale joins the Green Builder Media family—time to get to work!



ReVISION House Vegas, an energy retrofit in Las Vegas, is built for the IBS. This successful project reduced the HERS rating from 126 to minus 2, meaning that the house produced more energy than it used.

2009

VISION House Aspen, a luxurious, architect-designed home in Aspen, Colorado, demonstrates that green can be glamorous and appropriate for high-end markets.



GREEN BUILDER MEDIA'S JOURNEY



The Clocktower Remodel in New Orleans is transformed by Green Builder Media President Ron Jones, from a derelict clocktower in the Cotton Mill district into a one-of-a-kind, designer showcase with the best rooftop view in the city!

WINDOW				
Item	Quantity	Unit Price	Material Cost	Material Cost
Window for Installation	1	\$2.00	\$2.00	\$2.00
Window for Installation	1	\$2.00	\$2.00	\$2.00
Window for Installation	1	\$2.00	\$2.00	\$2.00
Window for Installation	1	\$2.00	\$2.00	\$2.00
Window for Installation	1	\$2.00	\$2.00	\$2.00
Window for Installation	1	\$2.00	\$2.00	\$2.00
Window for Installation	1	\$2.00	\$2.00	\$2.00
Window for Installation	1	\$2.00	\$2.00	\$2.00
Window for Installation	1	\$2.00	\$2.00	\$2.00
Window for Installation	1	\$2.00	\$2.00	\$2.00



2010



Since our inception, we've seen the industry take many steps forward—and plenty of steps backward. We've participated in the development of green building codes, regulations and policies. We've been a part of the rollout of the National Green Building Standard, WaterSense, LEED for Homes, Zero Energy Ready Home (ZERH) certification, and Indoor airPLUS. We've seen unprecedented amounts of federal funding spur advancements in and adoption of enabling technologies like heat pumps, demand-side energy management systems, and solar + storage.

We've also witnessed special interests and industry groups fight for rollbacks of energy codes, safety requirements, environmental protections, and corporate sustainability practices. We've observed strange and bitter battles as they play out in courtrooms and boardrooms.

Our commitment to the industry is still that we will continue to set the standard for excellence in sustainability, quality, resiliency, and wellness in the built environment. Everything that we do—from generating award-winning content, to developing leading-edge demonstration homes, to hosting thought leadership events, to offering pioneering market intelligence, to streamlining access to carbon offsets—advances our goal of transforming markets and improving the performance of the built environment.

We're thrilled that you're here with us for this wild journey to the frontiers of sustainability.

LOOKING AHEAD

After 20 years, I can honestly say that I have never been more excited about the rate and pace of change that is taking place in the building industry. The conversation has decidedly shifted from net zero energy to net zero carbon, as building professionals and manufacturers alike find ways to reduce embodied and operational carbon.

Stakeholders throughout the entire value chain have awakened to our pressing environmental realities, and sustainability is now an intelligent strategy to reduce costs, increase resiliency, mitigate risk, strengthen supply chains, improve employee relations, and enhance customer loyalty.

While it is likely that we'll see environmental protection and sustainability policy rollbacks at the federal level in the next few years in the U.S., we can also expect to see major advancements in municipal and state-based codes, regulations, and funding mechanisms that drive adoption of energy efficiency, electrification, renewable energy, and resiliency—particularly in cities like Los Angeles, New York, San Francisco, San Diego, Boston, Seattle, and Houston, which have made aggressive emissions reduction commitments for 2030 that largely rely on green building initiatives.

The Readers' Choice/Sustainable Brand Index program launches.

The Sustainable Products of the Year program launches.



VISION House Orlando and **ReVISION House Orlando**—two unique homes, one new and one retrofit—are built in Orlando for the IBS. They blend advanced green technologies with sophisticated sustainable design.

2011

Even with potential tariffs and regulations under the new administration, solar has undeniably become a cost-competitive energy resource for the U.S. The American Clean Power Association (ACP) projects that the U.S. solar market will grow 6.6 percent annually from 2025 to 2030, reaching 37GW of annual new installations by 2030, and that solar capital costs will continue to drop 14 percent by 2035 due to declining module prices.

On a global scale, a recent report from think tank Ember indicates that we're reaching peak fossil fuel use, with approximately 50 percent of countries transitioning away from fossil fuels. Most notably, China is nearing a period of declining fossil fuel use, opting instead to adopt renewable energy at warp speed.

According to the Ember report, wind and solar adoption has slowed global fossil power sector growth by nearly 75 percent over the past 10 years. Coal hit its peak in 2008 and now one-third of the richest nations in the world are coal free (including the United Kingdom, which shuttered its last coal-fired power plant in 2024).

While we're still a far cry from the 43 percent emissions reduction target that would keep us under a 1.5 Celsius degree warming threshold—the point at which environmental damage is irreversible—new mechanisms are emerging to mitigate risk and enable us to meet our climate goals.

CELEBRATING ACHIEVEMENTS

In the U.S., the green building market is surging, driven by the combination of consumer demand, investor requirements, ratcheted codes, and enabling technologies. Remarkable strides are being made in areas like energy efficiency, electrification and decarbonization.

Programs like the U.S. Department of Energy's ZERH certification have paved the way for builders to meet higher energy performance standards. Thousands of homes across the country now meet or exceed net-zero energy benchmarks, reducing emissions and lowering costs for residents.

States like California and Washington have set the bar with aggressive updates to building codes, and by mandating higher energy efficiency, electrification, and renewable energy integration.

States like Massachusetts and Colorado have adopted or are advancing policies aligned with net-zero emissions targets.

Cities such as New York and Seattle have introduced groundbreaking policies requiring electrification in new buildings. New York City's Local Law 97 sets clear carbon reduction mandates for large buildings, while Seattle's Energy Code leads the way in transitioning away from fossil fuels.

No doubt, the future holds immense promise. The U.S. green building market is projected to grow at an annual rate of over 8 percent through 2030, fueled by billions of dollars in incentives for energy-efficient buildings, retrofits, and clean energy technologies.

In 2025, we can expect to see the launch of ANSI standard 1550, which will standardize the calculation of embodied carbon in residential projects, and continued adoption of standards like ASHRAE 90.1, pushing the industry toward decarbonization.

Manufacturers will also continue to play a pivotal role, releasing innovative sustainable building materials that will reshape the construction landscape—such as recycled glass cement additives to reduce the embodied carbon of concrete, ever-smarter electrical panels that optimize peak load shifting and shedding, and phase change materials that store and release heat in response to ambient temperature changes.

And consumer demand will remain a driving factor, pushing climate action further and faster than ever before. Values based and mission driven, Millennials and Gen Zs are steering the economy to new frontiers. These individuals have more economic power than any previous generation. They are now earning more, saving more, and investing earlier than their parents and grandparents, and they're on the receiving end of a wealth transfer of tens of trillions of dollars that will continue to impact the entire economy, particularly the housing sector, for decades to come.

Even as we celebrate these achievements, it's crucial to recognize the urgency of the challenges ahead. Achieving our ambitious—and necessary—climate targets will require even greater collaboration, innovation, and perseverance in the years to come. **GB**

GREEN BUILDER MEDIA'S JOURNEY



The First Emerald Circle Thought Leadership Event at Devil's Thumb Ranch in the Colorado mountains hosts sustainability experts, industry influencers, and powerful change makers—including Craig Coale and Ron Jones!



The Impact Series: Game Changers in Sustainability webinar program launches. These sessions include sustainability leaders on the front lines of climate action.



VISION House® in INNOVENTIONS at Epcot® at the Walt Disney World® Resort in Orlando opens. Green Builder Media partners with Disney to create an attraction focused on sustainable living in the Epcot theme park. The exhibit reaches more than 6 million people annually for three years.



VISION House Los Angeles, an architect-designed infill project with Structure Home that integrated sophisticated style, advanced technologies and intelligent systems launches.

VISION House Tucson is built by legendary green builder John Wesley Miller in his famous infill community Armory Park, which had replaced derelict railroad housing and enjoyed national recognition.



2012

2013



They should announce Groundhog Day 2 but just re-release the original.

Out in front. The Green Builder team continues to push the sustainability envelope, helping the industry to find new ways forward that are both profitable and environmentally responsible.

GREEN BUILDER MEDIA'S JOURNEY



A new and improved **online presence** for Green Builder Media: An integrated multimedia technology platform is launched, enabling us to expand our digital presence and reach.



The Celestia Project, a 9-part series, looks through a lens of sustainability and green living at what life might be like in the year 2100. It wins an Eddie in the national 2015 Folio competition.

2014

INDUSTRY HIGHLIGHTS

2006

- WaterSense certification is launched by the Environmental Protection Agency (EPA).
- LEED for Homes program is launched.

2008

- Creation of the first International Green Construction Code for residential buildings (IGCC 700), a joint initiative of the International Code Council and NAHB, chaired by Green Builder Media President Ron Jones.
- Zero Energy Ready Homes (ZERH) and Indoor airPLUS certifications are created by the Department of Energy (DOE) and EPA.

2009

- An update to the International Energy Conservation Code (IECC) to enhance energy efficiency and home performance, and American Recovery and Reinvestment Act (ARRA) allocated funds for energy-efficient building retrofits and the development of green technologies.

2010

- ENERGY STAR updates its standards for new homes to encourage builders to meet higher energy efficiency goals, including better insulation, more-efficient HVAC systems, and reduced thermal bridging.

2012

- The federal Solar Investment Tax Credit (ITC) is extended and state incentives increased, making residential solar power accessible and affordable.

2015

- The Paris Agreement and Global Climate Targets underscore the global commitment to limit global warming, accelerate the adoption of net-zero energy homes and promote carbon reduction strategies across the construction sector.
- California becomes the first state to mandate that all new homes built after 2020 must be net-zero energy.

2016

- New York's Carbon Challenge, aimed initially at commercial buildings, begins influencing the residential sector. The challenge encourages energy efficiency and the reduction of carbon emissions in residential construction, leading other cities to adopt similar initiatives.

2017

- International Association of Plumbing and Mechanical Officials (IAPMO)'s Water Efficiency and Sanitation Standard (WE•Stand) created.

2018

- The Green New Deal, a proposed policy framework, is introduced. This plan included ambitious goals for energy efficiency and renewable energy in housing.

2020

- The Weatherization Assistance Program, which helps low-income households increase energy efficiency, receives more funding and support.

- The 2021 International Energy Conservation Code (IECC) proposes improved energy efficiency standards for homes, and various states began adopting these codes in 2020 and beyond.

2021

- The Residential Zero Energy Appendix is added to the 2021 IECC. This requires new homes to be built with enough efficiency and renewable energy to achieve a zero Energy Rating Index (ERI) score.
- The U.S. recommitted to the Paris Agreement, leading to renewed focus on decarbonizing homes and increasing incentives.

2022

- The Inflation Reduction Act (IRA) introduces new incentives for energy-efficient home upgrades, rooftop solar, heat pumps, and EV infrastructure.

2023

- California Governor Gavin Newsom signs three climate disclosure laws that shape climate disclosure practices beyond the state's borders.

2024

- U.S. Securities and Exchange Commission (SEC) adopts rules that will require public companies to disclose extensive climate change-related information in their SEC filings.

10 years into the journey—our heads were down planning for the next decade!



The Arc House, a net-zero energy, solar-powered home, receives a fantastic response at building conferences in Los Angeles, Las Vegas and San Francisco.

- **Code Watcher** launched



COGNITION Smart Data, Green Builder Media's market intelligence and data service is launched.

2015

2016

2017

GREEN BUILDER MEDIA'S JOURNEY [CONTINUED]



Flex House - A 768-square-foot modular home by Shelter Dynamics that embodied the concept of "Right Sized Living," made a big impression with its high ceilings, arched doorways, rounded corners, clerestory windows, and U-shaped flow. We brought the Flex House to three important industry shows, including the famous Consumer Electronics Show in Las Vegas.



The Align Project demonstrates how to harmonize our spaces, technology, finances, and mobility solutions with our health and wellness, to live with grace and age with dignity. The cornerstone of The Align Project was a prefab, net zero, precision-engineered "Intuitive Home," built in conjunction with prefab builder Kasita. We brought The Align Project exhibit with much fanfare to three key industry shows. It was purchased by the CEO of Zappos and installed permanently in a community in downtown Las Vegas.

2017



ReVISION House Austin: An urban farmhouse retrofit with a Millennial couple who were eager to determine the highest-impact sustainability upgrades on a limited budget. The project transforms a sprawling, poorly designed ranch home into a bright and cheery family house that takes advantage of every square inch of space.

Sustainability Symposium 2021: Into the Light

2018

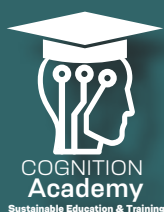


The Sonders Project, built in conjunction with regional production builder Thrive Home Builders, is Green Builder Media's first zero carbon project. The Fort Collins, Colorado-based demonstration homes showcase advanced products, systems, and technologies that reduce embodied and operational carbon. We purchased carbon offsets to abate the emissions that couldn't be offset by addressing performance and meticulously specifying low carbon products.

Sustainability Symposium 2022: Roadmap to Decarbonization

Annual Generational Marketing report launched

2021



MARIPOSA MEADOWS

COGNITION Academy is launched. Green Builder Media's sustainability curriculum teaches building professionals and manufacturers about net zero carbon building, green building fundamentals, green product essentials and green building programs such as ENERGY STAR, ZERHs, Indoor airPLUS, WaterSense, and HERS ratings.

COGNITION Carbon Offsets Marketplace is launched to streamline access to high-quality carbon offsets to mitigate emissions from projects, products, travel, and homes so that we can meet our climate targets.

ESG for Building Defining Principles. Green Builder Media forms the ESG Working Group, comprised of roughly 65 of the industry's brightest minds, to create a set of definitive principles for the U.S. housing market. These serve as a framework for industry-specific ESG opportunities, priorities, metrics, reporting, and compliance best practices.

Mariposa Meadows opens. This is an off-grid sustainability compound designed and constructed by Ron Jones, consisting of three homes surrounded by millions of acres of national forest in the San Juan Mountains of Colorado. This unique project unites extraordinary design, extreme performance, innovative products, and intelligent technology in a magnificent natural setting.

Sustainability Symposium 2024: Existential Solutions

2024



Sustainability Symposium 2019: The Desert Shall Bloom drew numerous personalities, including actor Jeff Bridges, who granted an interview to Green Builder Media President Ron Jones.



The Housing 2.0 program, a building professional training and education program with Sam Rashkin, former chief architect of the U.S. Department of Energy (DOE), launches.

The Today's Homeowner program is launched to provide information to Green Builder Media's consumer audience about how to make their homes and lives more sustainable.

2019

2020



VISION House Sussex, with esteemed Tim O'Brien homes in the greater Milwaukee area, demonstrates that sustainability can be attainable for average American families. This project optimizes performance, sustainability, health and wellness, intelligence, and resiliency at an attainable price point.

ReVISION House Scottsdale is a deep-energy, healthy, pandemic-proof retrofit with industry influencer and building science expert Steve Easley and his wife, indoor air quality expert Susan Raterman. This project takes an energy inefficient home and turns it into a high-performance masterpiece!

Sustainability Symposium 2023: The Great Conversion

Transcend Communities is a prefab line of homes, designed and constructed with Dvele. This completely sustainable, net zero, electric, healthy, resilient, and intelligent line of homes has the potential to transform the housing industry.

ESG Consulting Services launched.

Annual Energy Insights report launched.

2023



2025-20th Anniversary!

VISION House Las Vegas will open. This is a 61-home community with Beazer Homes, the 11th-largest home builder in the country. All homes will be net zero, all-electric, healthy, connected, solar powered, and certified to the DOE's ZERH program.

VISION House Austin will open. Designed by famed sustainable architect and AIA Fellow, Peter Pfeiffer, this project highlights climate responsive design, including energy and water management to address growing grid and drought challenges. This climate responsive home is stylish while maintaining a reasonable price point.

VISION House Hickory Grove will open. This is an infill residential townhome subdivision in Hickory, N.C. with Howard Building Science featuring 17 prefab homes. The homes will be certified to the DOE's ZERH program, consuming up to 50 percent less energy than traditional new construction. This project will demonstrate that homes can be high-performance and attainable in today's housing market.

Sustainability Symposium 2025: A Force of Nature

2025



Shifting Down Without Compromise

Austin homeowners Judi and Robert George opted for a greener custom home where they can age in place.

BY MICHELE LERNER

As many people age, they dream of a simpler life where they can leave home maintenance chores behind to focus on a healthy and comfortable lifestyle. Some older adults opt for a one-level condo, with a management company to handle landscaping and other tasks. Not Austin homeowners Robert and Judi George. They tend to think big even as they strive to shrink their impact on the planet. “About 15 years ago, we were on a road trip and started dreaming about our forever home,” says Judi, 84. “We definitely knew we wanted a house that would be energy efficient, preferably run with solar power or maybe wind power.”

The Georges didn’t take action then, but the idea of living in a house built to meet their needs and imagination kept percolating. Then, 10 years ago, the couple was in a serious car accident.

“We both recovered but we have some remnants of physical issues that make it a little harder to get around, especially as we get older,” Judi says. “It wasn’t until about three years ago that we were talking to a close friend and neighbor about this idea of building a custom home and he told us that we already had the perfect solution right in hand.”

Affordability minded. When construction is completed, owners Judi and Robert George will have a single-story, elderly friendly house with sustainable features such as solar panels, a variable speed heat pump, and high-grade insulation to cut energy costs.

CREDIT: COURTESY OF BARLEYIPFEIFFER ARCHITECTURE



A top plan. The Georges' forever home includes cool metal roofing by Fabral, which can withstand harsh weather, resist corrosion, and contribute to improved energy efficiency due to its heat reflective properties. CREDIT: GREEN BUILDER MEDIA/CRAIG COALE

The Georges, who purchased a home in Austin in 1992, decided in 1994 to buy the lot next door to expand their land and prevent another house being built too close to them. Their friend pointed out that they could hire an architect and a builder to create the forever home they dreamed of without leaving the community they already love.

"We didn't buy that land with the idea of building anything on it, but that decision from 30 years ago is really paying off now," says Robert, 83. "We didn't want to leave this area. We have our friends, our church and our doctors nearby."

As they began planning their custom home, the Georges found that Alan Barley and Peter Pfeiffer, founders of Barley|Pfeiffer Architecture in Austin, shared their philosophical approach to building a home that would be sustainable, high performing and appropriate for aging in place. The architects, in partnership with Green Builder Media, developed the plan for VISION House Austin to showcase the viability of resilient design even in Austin's extreme climate. The high-performance, healthy home, built with universal design principles, is currently under construction by Justin Moore, owner of White Elephant General Contractors in Austin.

Since their home is adjacent to the construction site of their soon-to-be home, the Georges have had the pleasure of watching their vision take shape. They hope their experience will help others pursue their goal for a highly sustainable healthy home.

"The biggest advice I have for anyone is that perseverance is key," Judi says. "We selected a builder when we first decided to build on our lot, but that builder came in with a budget twice what we expected. That was a big hiccup, and I was ready to give up."

Judi says that Robert will "talk her off the wall" whenever she's ready to quit anything. He kept them going until they found Barley|Pfeiffer. "I think people need to realize that nothing is impossible," Robert says. "You just have to be committed to make your dreams come true."



Downright durable. The house features stylish plank siding from JamesHardie, which is engineered to protect against damage from fire, water, extreme weather, pests, and time.

CREDIT: GREEN BUILDER MEDIA/CRAIG COALE.

PRIORITIES FOR A LIFE WELL LIVED

The Georges' current residence, a custom home built for the original owners in 1985, has worked well for them since they purchased it. But now, they want less rather than more. Before their friend suggested they build a custom home on their lot, they considered other possibilities, such as moving out of state or to other nearby communities.

"We really want a one-story house with an open concept that makes it easier for us to move around the house," Robert says. "We have a pool now and we don't want it anymore because of all the maintenance and expense."

Barley and Pfeiffer understood their priorities and have a history of designing homes in harmony with the land, Robert notes.

"Their minds just meshed with our thoughts about what we wanted to create here, so when they came up with a design that's all on one level and takes advantage of the site, we were ready to go," Robert says. "They explained the concept of siting the house to allow for plenty of natural light while minimizing heat gain and moving the rooms that we don't use in the daytime to the west-facing side of the house that gets the hottest sun."



Point of view. The Georges' home embraces sustainability construction concepts such as siting the house to allow for plenty of natural light. CREDIT: COURTESY OF ROBERT AND JUDI GEORGE

Heat shield. The home features Andersen windows, which are made with composite *Fibrex* material which is twice as strong as vinyl and blocks thermal transfer 700 times better than aluminum.

CREDIT: GREEN BUILDER MEDIA/CRAIG COALE

The idea of living in a house with modern design concepts along with the sustainability features they want such as solar panels, a variable speed heat pump that mitigates humidity for more comfortable temperatures, and a cool metal roof, is exciting for the Georges. In addition, the couple is looking forward to spending less money on utilities with a net zero house.

FINANCES FALLING INTO PLACE

Building a custom home, while appealing to many, isn't always financially feasible. Robert, a retired accountant, works part time providing IT and accounting support for a local business. The couple was also able to tap into their home equity to finance their new one.

"We own our home free and clear, so we talked with a mortgage broker about how to pay to build a new home," Judi says. "One of his ideas was to use a home equity loan to borrow from our current home to get the project started. We were able to get a good deal with a credit union."

The Georges paid the architectural fees, the cost of clearing and preparing the lot for construction, and some incidental fees with their home equity loan.

"We also have a construction loan for the building phase of our new house," Judi says. "The plan is to sell our current home and use the proceeds to pay down the bulk of the construction loan. Then we'll have a small mortgage to pay for the rest."

They also expect their home operating expenses to be significantly reduced because of the sustainability features and the elimination of pool maintenance costs.

RELIVING THE AFTERMATH OF A FLOOD—DELIBERATELY

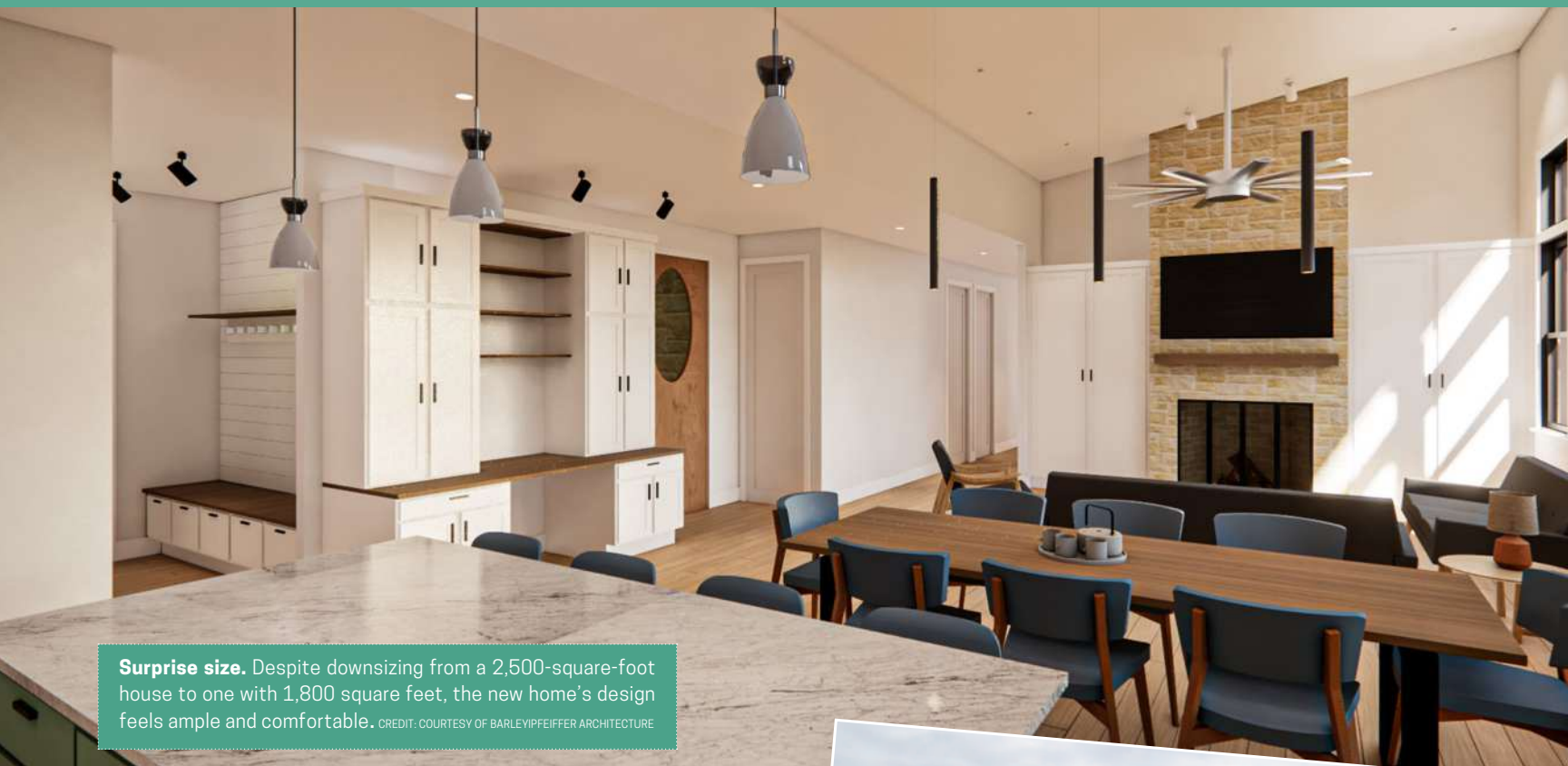
The Georges are downsizing from a 2,500-square-foot home to one with 1,800 square feet, but the design of their new home makes them feel as if they're losing very little living space. However, they still find moving preparations overwhelming.

"We've lived in this house for 28 years, so we've accumulated a lot of things," Judi says. "But we plan to donate most of it and bring in new furniture for our new life. We're ready to start over again."

The Georges already started over back in the 1990s.

"We owned a riverfront property in Plano, Illinois, and in 1996 there was a massive 24-hour rainstorm that flooded our home," Robert says. "We put our computer, TV and some paperwork in the car. Otherwise, all we were able to salvage was a wrought-iron bed, a dining table and our patio furniture."

After living in a tiny apartment with their patio furniture in the living area, the couple decided to move their minimal belongings



Surprise size. Despite downsizing from a 2,500-square-foot house to one with 1,800 square feet, the new home's design feels ample and comfortable. CREDIT: COURTESY OF BARLEVIPFEIFFER ARCHITECTURE

via a small truck to live full-time at their Austin property, which they had used as a vacation home.

"Now we're back to 'maximal clutter' again," Robert says.

The couple began downsizing when ground was broken on their new home in June 2024. "Robert is more sentimental than I am and has more trouble letting go," Judi says. "But we got rid of his old computer books and software. Our dining table was covered with books and a minicomputer from the 1980s that Robert gave to someone who plans to restore it."

The couple has donated some of their belongings to a nearby senior center and will donate their furniture there, too. "They have a thrift store that funds the senior center's activities and low-cost meals for seniors," Judi says.

The Georges hope that sharing their experience with building a custom "forever" home will help other people in their stage of life.

"We're really looking forward to a simpler life with a lower cost of living," Judi says. "We want to show other people there are solutions that may work for them." **GB**



Tightening up. Henry's *Blueskin* and its *R-Tech* insulation combine to provide air and water-resistive barrier membranes that can be used to improve the thermal performance, air quality, and longevity of the building. CREDIT: GREEN BUILDER MEDIA/CRAIG COALE.

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QUANTIFIABLE AIR QUALITY

By combining new sensors and mechanicals with online tools, homeowners can control IAQ much more accurately.

BY J.V. ROBERTSON

Is the front door locked? How about the back door or the windows? Is the back gate open? These are the kinds of questions people ask before they go to bed at night. They run through a small checklist of security measures as a matter of common sense. But there are more, less-considered questions: Is there mold in the air? What about nitrogen dioxide? Radon? Formaldehyde?

These days, making a home safe doesn't stop at a camera for the front door. The same quality air that's documented on a smartphone's weather app is what makes its way into a home, and it may even be further contaminated by local particles.

Fortunately, there are a variety of products designed to ensure the air in the home is fresh and clean. Furthermore,

some of these items can even lower a house's energy costs, saving not just the owner's lungs, but their wallet as well. Here are five air-cleaning devices and processes that can help everyone breathe easier.

INDOOR AIR QUALITY MONITORS

Before moving into overhauling a home's HVAC setup, it might be good to know exactly what needs to change. That's where indoor air quality (IAQ) monitors come in. These handy little sensors can be set up just about anywhere in a home, whereupon they'll keep track of multiple aspects of the air in real time. Depending on the model, a homeowner can learn where their home's air sits on the standard U.S. Air Quality Index (AQI), as well as the amount of CO₂, particulate matter, volatile organic compounds (VOCs), or

other contaminants they may be breathing in along with all of that life-giving oxygen. While this eldritch knowledge may come with the cost of never being able to unlearn what an owner now knows about a living space, IAQ monitors are nonetheless essential in determining just what steps need to be taken to make a house's air the best it can be.



Indoor air quality units such as the **AirVisual Pro Monitor** and the **Awair Element** measure air pollution caused by actions such as cooking, cleaning, wood burning, interior decoration, and smoking. Real-time and historic air quality data can be viewed via free apps from the manufacturers.

AIR PURIFIERS

When anyone starts questioning how to improve their home's air quality, typically their first idea will be to purchase an air purifier. This is a good impulse—air purifiers, as the name might imply, take in air that's loaded with pollen, pet dander, VOCs, mold, and other contaminants, and pass it through a series of filters, until only clean air remains. Several of them also have High-Efficiency Particulate Air (HEPA) filters, which can capture particulate matter as fine as 0.3 microns in size; others use carbon filters for deodorization, or UV light to sterilize the air as it passes through them.



All-purpose air purifiers often specialize in one type of cleansing. **Alen's BreatheSmart 75i** is known for its effectiveness with removing allergens, while **Rabbit Air's A3** model diligently takes on pet dander.

SMART THERMOSTATS

Arguably the most easily acquired method to adjusting a home's air quality and energy efficiency, new household thermostats come packed with additional features and improvements over the classic mercury tube or battery-powered "hot or cold" temperature adjuster. Many of them have dedicated "low-energy" modes that you can switch on while a homeowner is asleep or away. Several also come pre-loaded with IAQ monitors, which can be set up to automatically adjust their settings based on allergen or humidity levels, ensuring the owner only uses the extra energy to deep-clean the air when it is actually needed. Lastly, nearly all of them can connect to a smartphone, allowing an owner to interact with them from anywhere.



ecobee's Smart Thermostat Premium quality monitor alerts the homeowner when air quality is poor and offer tips on how to improve it. **Nest's new 4th Generation Learning Thermostat** includes an algorithm that automatically adjusts a homeowner's heating and cooling schedule based on how the thermostat is used.

HUMIDIFIERS

Humidifiers—and their cousins, dehumidifiers—do what one would expect of them: They take the air in a given space and adjust the level of moisture present within it. Humidifiers add to the moisture level, while dehumidifiers take away from it. Both options have their own merits. Humidifiers tend to be more useful in colder climates, when cold, dry air can cause cracked skin, sore throats, nosebleeds and respiratory issues. Dehumidifiers, meanwhile, are usually used more in warmer environs or summer months, where they can help prevent odors, or the growth of mold or mildew.

In both cases, there are portable options to only change a smaller space, or larger HVAC installations to provide more optimal control over an entire house. Several models also include built-in hygrometers that monitor the current moisture level of the space, allowing them, like the aforementioned smart thermostats, to turn themselves on only when they're needed.

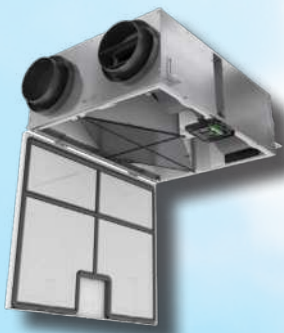


Smart humidifiers keep the air smelling and feeling fresh, while also being extremely easy to operate. **Levoit's LV600S Smart Hybrid Ultrasonic Humidifier** provides a choice between warm and cool mist, while the Wi-Fi-enabled **BlueAir InvisibleMist Humidifier H35i** offers smart controls and a self-cleaning, self-drying water tank.

VENTILATORS

If a homeowner is looking to make a big change, redoing the house's HVAC setup can help improve indoor air quality and lower energy bills—especially if the home is newer. Modern, energy-efficient homes are more tightly sealed than their progenitors. While this is technically better for energy efficiency, it can dramatically affect air quality. Fresh air ventilators are necessary to allow the air to properly circulate between the inside and outside of the house. Once upon a time, this would have been something of a no-win scenario: Someone could have effective circulation or an energy-efficient home.

These days, however, both options are possible, thanks to energy recovery ventilators (ERVs). ERVs take fresh but unconditioned air from outside and pass it over a cooling (or heating) medium before it enters the house, resulting in “new” air that’s already close to a preferred household temperature. This simple process can drastically lower energy costs, while also preventing the air in the house from growing too stale.



Energy recovery ventilators (ERVs) such as the **Broan ONE Interior Ready Energy Recovery Ventilator** and **Panasonic's BalancedHome ERV** adjust incoming air and balance indoor moisture levels to create a healthier, more-comfortable environment throughout the year. They can also lower a home's HERS scores by several points if installed correctly.

UNCONVENTIONAL AIR QUALITY

Here are two more lesser-known factors to consider when trying to improve indoor air quality:

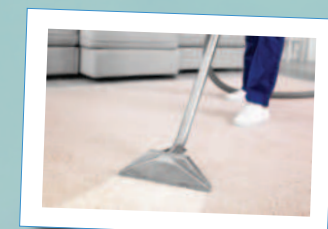
HOUSEPLANTS

For a smaller-scale, cheaper, and more-natural solution, simply add a little greenery to the living space. Plants remain one of the most readily available solutions for improving air quality. They're easy to find, cheap to maintain, and they look great. Bamboo palms, Boston ferns, peace lilies, and dragon trees are just a few examples of plants that are known to substantially reduce pollutants, toxins, and CO₂ levels—with no energy usage required—while simultaneously functioning as pleasant, relaxing decor for a living space.



CARPETS

Many carpets are made from some variation of synthetic, petroleum-based material. This material is often treated with other chemicals to improve stain resistance, wear or color retention. Also, many are installed over highly toxic rubberized pads, and they may be glued to the floor with pungent adhesives.



The result of this noxious combination—often referred to as “off-gassing,” or the release of VOCs (volatile organic compounds) into the air—usually dissipates within 72 hours of carpet installation when accompanied by good ventilation. But the Environmental Protection Agency (EPA) suggests selecting a product with low or no VOCs, no toxic dyes, is made from recycled content and is recyclable, and has a minimum 10-year warranty. After installation, the product will actually help absorb particles from the air, so cleaning it regularly is a necessity. **GB**

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By now you may have noticed that we are celebrating our 20th anniversary at Green Builder Media in 2025. Our premier issue of Green Builder Magazine appeared in January 2006, but Sara and I had incorporated the company the previous Spring and worked hard through the intervening months so we could make a big splash at the 2006 International Builders Show (IBS).

At the time, there were plenty of people who didn't think we would survive for 20 weeks, never mind a score of years and counting. But in the immortal words of author Victor Hugo, "Nothing else in the world...not all the armies...is so powerful as an idea whose time has come."

Of course, there was no way to be certain that our timing was right. But by the time we took the plunge, the intent of the project was already a decade old. There had been a great deal of patience exercised, because the industry marketplace was simply not prepared for all the changes that were about to take place.

In 1996, I engaged the services of a very capable intellectual properties attorney to help me attempt to secure the trademark GREEN BUILDER. He cautioned me that it might be especially difficult to succeed in the effort because of the quite generic nature of the terms, but I had nothing to lose except time and money. We submitted the application as required and waited for the results. It was 1999 before the trademark was initially awarded (it became "incontestable" in 2005) and I began to use it in every opportunity I encountered.

In some ways, owning a trademark is like having a large carnivore for a pet. It has to be fed regularly. Intellectual property such as this must be put to use and must be defended from unauthorized use as necessary. It's a "use it or lose it" proposition.

Some of our readers may recall that I authored a monthly column in another prominent industry publication for a

time. The column was well received by readers. But it was quite apparent that the mainstream home building industry, including the building products manufacturers, were only beginning to timidly dip a toe into the scary new pool of sustainable development and green building.

By the time the National Green Building Standard (ICC-700) and the USGBC LEED for Homes rating system were ready for participants and project certifications, we were light years ahead of the legacy industry media companies. While they were mumbling about green building, trying to come up with their own definitions and how to communicate them with the players in the industry, we were already opening green demonstration projects at major national events around the country.

It seems we were always ahead of our time, for better or worse, so when the pandemic disrupted the traditional ways that companies operated and how their work gets accomplished, we were already firmly anchored to our remote work model (often much to the chagrin of potential investors and advisers who didn't approve). This allowed us to attract some of the best talent in the business and provide them with the atypical luxuries of working from home and exceptional schedule flexibility.

This has made it possible for us to assemble an extraordinarily talented team of like-minded, mission-driven professionals who tirelessly pursue their individual and collective passion for remaking the built environment so we can all inhabit a place of balance and abundance.

We are blessed with the undying support of so many great people and companies in this incredibly dynamic universe we know as home building. With the ever-increasing challenges related to climate change and the degradation of the planet's ecological systems—and with continued hard work, a great deal of luck, an unyielding commitment to integrity, and most of all, the efforts of everyone dedicated to sustainability—we can't wait to start another decade of our pursuit of the best possible world. **GB**

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