

Award-Winning Coverage of Sustainable Construction, Products and Lifestyles

# GREEN BUILDER<sup>®</sup>

March/April 2019 / [www.greenbuildermedia.com](http://www.greenbuildermedia.com)



# HOT50 PRODUCTS





The Thompson subcommittee will investigate whether any information regarding anti-trust immunity was in fact provided. That challenge will be resolved when the House Judiciary Committee, the subcommittee's parent body, releases its report. The subcommittee is also looking into whether any of the lawyers involved in the Baker Hughes case were involved in other matters, including whether they had any contact with the Justice Department or the SEC. The subcommittee is also looking into whether any of the lawyers involved in the Baker Hughes case were involved in other matters, including whether they had any contact with the Justice Department or the SEC. The subcommittee is also looking into whether any of the lawyers involved in the Baker Hughes case were involved in other matters, including whether they had any contact with the Justice Department or the SEC.



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PRODUCTS

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SUSTAINABLE  
PRODUCTS



The new degree of comfort.®



By Matt Power  
Editor-in-Chief

# Brand Excellence vs. Brand Arrogance

Trusted companies that listen closely to their customers improve products rapidly.

WHAT MAKES a great brand, when it comes to earning and keeping the mental space of sustainability? Let me give you two examples: Owens Corning and TOTO.

Over the years, OC has made repeated improvements to its insulation products, changing fibers to make them easier and safer for installers and do-it-yourself users. They constantly introduce new products while also elevating the sustainability of their plants and their end products.

Bill Strang, president of operations for TOTO, told me at a recent building show how his company stays on top of brand perception. Every time somebody comments or reviews a TOTO product online, somebody at the company gets an instant notification. “If there’s a problem, we respond directly to the person,” he explains. “We’ll have someone working on it almost immediately and making sure it’s fixed.”

Compare that level of response to my recent experience with a certain brand of “smart” outlet. I ordered a couple of these switches to supplement some I use on a home network, only to discover a major limitation: You can’t use them with the same app at more than one location—you’d need a separate smartphone with its own app.

My beef with this brand is not this product’s weakness, however. It’s the fact that the company hasn’t fixed it. On its own forum site there are numerous complaints about this issue. These complaints start in 2017, and the issue still hasn’t been addressed. That’s the opposite of brand excellence. It’s brand arrogance.

Great products and enduring brands require constant vigilance. Behind each product are smart, engaged people who anticipate and react to end users. Any marketer knows that one negative review can undo a dozen positive ones.

Congrats to this year’s brand leaders in the arena of sustainability and high performance. More than just a collection of well-designed



products and systems, they represent a living body of work, if you will. This year’s Hot 50 selections are not “static” products or brands. Look deeper, as our Readers’ Choice brand survey does, and you’ll see that the brands in the top tier are in constant motion. Their innovators know there’s no sitting still in the ever-shifting mental landscape of brand leadership.

Building an enduring, respected brand takes determination, smart people and—often—humility. The customer is (still) almost always right. The best of the best never stop listening. Cheers to this year’s award-winning products and companies. Keep up the good work. **GB**

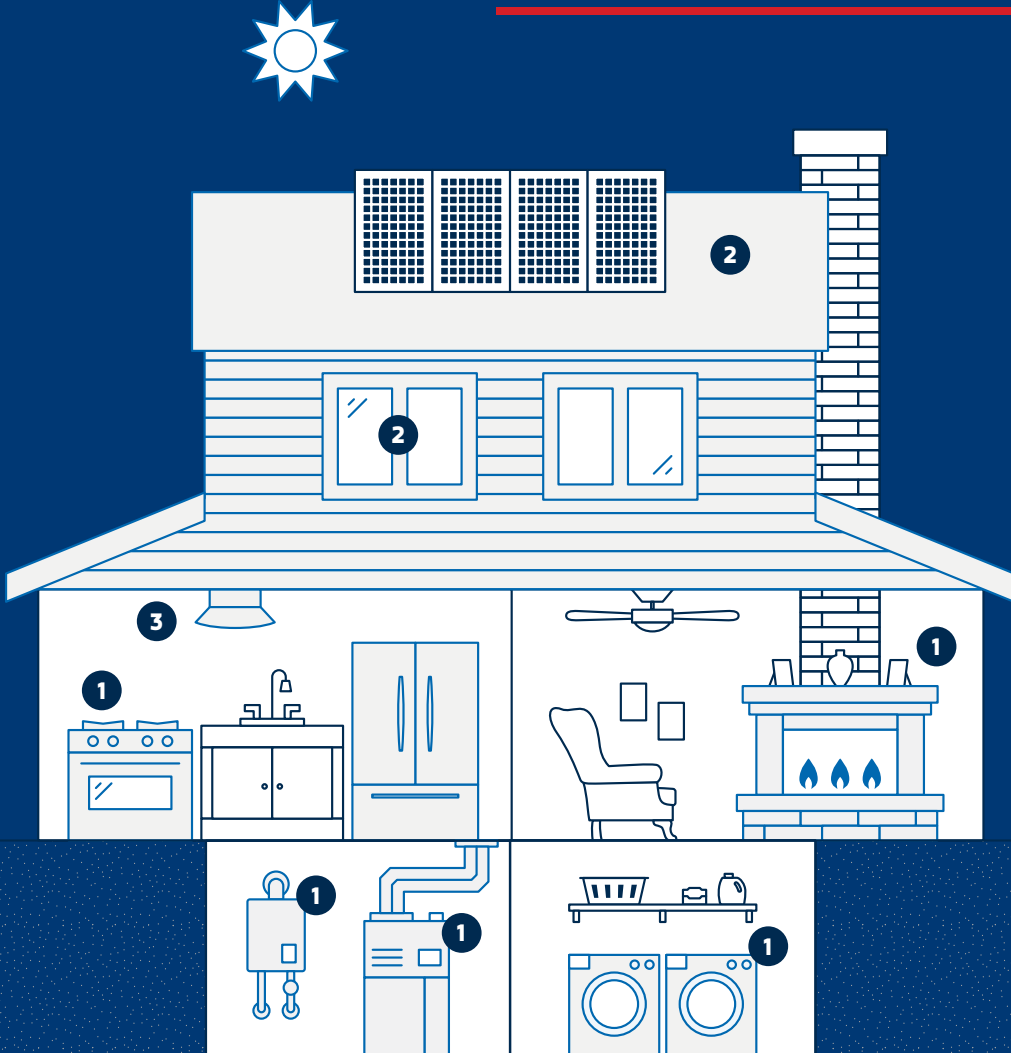
## Which company offers the greenest HOT WATER SYSTEM?

Bosch	<div></div>	34.3%
Rheem	<div></div>	30.9%
Rinnai	<div></div>	10.3%
A.O. Smith	<div></div>	5.9%
Bradford White	<div></div>	4.9%
Stiebel Eltron	<div></div>	4.9%
Takagi	<div></div>	3.4%
Noritz	<div></div>	3.4%

**Bosch clout.** In the building product arena, Bosch’s leadership on sustainability puts it head and shoulders above many of its competitors. Its cross-platform attention to responsible products offers good role modeling for U.S. firms.

# EFFICIENCY THAT MAKES REACHING ZERO NET ENERGY POSSIBLE.

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- Insulation quantity
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- Window performance
- House orientation

#### 3. TRIM OTHER ENERGY USE:

- LED lighting
- Energy monitoring devices

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# Seattle Cascades

VISION House by Green Builder Media



Imagine what your house would look like if the greatest minds in sustainability, performance, and design came together to build it – with the goal of remaining within your design parameters and budget.

**T**HE EXPERIENCED PROFESSIONALS at Green Builder Media have joined forces with internationally-acclaimed building scientist and production builder CR Herro (VP Innovation, Meritage Homes) and pioneering green architect Stace McGee (Founder, Environmental Dynamics Inc) to create the VISION House Seattle Cascades: The House the Experts Built.

Located in Enumclaw, WA (the gateway to Mount Rainier National Park) the VISION House Seattle Cascades features the most advanced products, systems, and technologies to achieve extraordinary performance results – all at a reasonable price point. The net-zero, solar powered, high performance, resilient, healthy, and intelligent home boasts stunning design details, an open floor plan, and innovative materials.

Through meticulous planning, space is optimized to significantly reduce material use, jobsite waste, and cost. By deploying advanced building science and superior construction techniques, the home will exemplify resource efficiency and promote occupant well-being.

The result: a simple, replicable template that homeowners and builders can follow, based on decades of experience in the fields of green building, sustainable design, and building science.

#### FOR MORE INFORMATION:

Look for ongoing editorial coverage about the VISION House Seattle Cascades from Green Builder Media in the coming months. In the meantime, be sure to check out the project microsite at [www.greenbuildermedia.com/vision-house-cascades](http://www.greenbuildermedia.com/vision-house-cascades) for updated articles, videos, and news about the project.



**That's the position that Whirlpool brand holds when it comes to appliance sales in the U.S.\***

Consumers count on the appliances in their homes every day. That's why it's important to provide them with products they know they can trust. Whirlpool, the top-selling appliance brand in the U.S., is one of **several leading brands in our differentiated portfolio**. So no matter what your customers need, they can feel confident that they're working with an industry leader – and you can too.

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\* Based on 12-month average of unit sales. Refrigeration, Cooking, Dishwashers and Laundry appliances. TraQline, 2017

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## New 'Green' Will Mean New Green Homes

Over the next few years, sustainability-based lending is poised to become the new normal.

IT'S GOING TO BECOME EASIER TO BUILD—and buy—green homes in the next few years, due to an expected increase sustainability-based loans. According to GreenBiz Group (GBG)'s 2019 *State of Green Business Report*, green-linked funding reached \$36.2 billion in 2018. That's up from \$32 billion in 2017, according to environmental finance news and analysis firm Environmental Finance, and it's a trend that's expected to continue into the next decade. Both companies consider green lending to be a "rising star" among businesses large and small, mostly because banks see sustainability-minded companies as a safer investment than traditional borrowers.

"A company's focus on sustainability performance can be a measure of innovation, as well as an indicator of good management," notes report co-author Libby Bernick, managing director of S&P Global-Trucost corporate business. Such companies typically outperform others and represent a lower credit risk, she adds.

Another attractive element is the fact that borrowers can use the loans for any corporate general purpose, instead of only for specific green projects or



CREDIT: SPOONHISTOCK

**Dollar wise.** Sustainability-minded companies are making a good impression with banks—leading to better, less-expensive business loans.

technology, GBG notes. And unlike the other common funding source, green bonds, sustainability loans are often easier to arrange and have lower lending thresholds, making them more accessible to smaller companies.

Green loans are also going to become easier to find. Early innovators such as Barclays, ING Bank, BNP Paribas and BBVA are carrying 10 to 15 percent of their lending portfolios as "responsible finance" and plan to at least double that total within the next five years. Yann Gerardin, head of corporate and institutional banking at BNP Paribas, notes that interest rates will ultimately be driven by a company's degree of environmental, social and governance (ESG) performance.

The *State of Green Business Report* is available at <https://bit.ly/2NZrl3S>. **GB**

## GOING GREENER EVERY DAY

**Other key findings in the 2019 *State of Green Business Report* include:**

- Companies' greenhouse gas emissions decreased by 9 percent from 2013 to 2018.
- Eighty-five percent of S&P 500 companies published a sustainability report in 2017, up nearly 20 percent in 2013.
- Twenty-eight percent additional companies set carbon emission and water-use reduction targets over the past five years.
- Current carbon reduction targets make up 16 percent of the total needed to meet the Paris Agreement's global warming limit of less than 2° Celsius by century's end.

## USGBC Unveils New Version of LEED

Version 4.1 will tighten performance standards for green building construction.

REGISTRATION IS NOW OPEN for the U.S. Green Building Council (USGBC)'s newest version of its LEED green building certification program, LEED v4.1. Participation is open to new construction projects as well as interior spaces with LEED v4.1 BD+C and LEED v4.1 ID+C.

According to USGBC President and CEO Mahesh Ramanujam, LEED v4.1 will help make the rating system more accessible to more projects. "This newest beta version updates performance thresholds and referenced standards to ensure LEED remains the global leadership standard for green



buildings and continues to expand the marketplace for LEED," he says.

The changes also advocate for improved performance throughout the life of buildings, rewards leaders based on their performance and incorporates performance reporting to enable building owners to track progress towards environmental, social and governance goals, he adds.

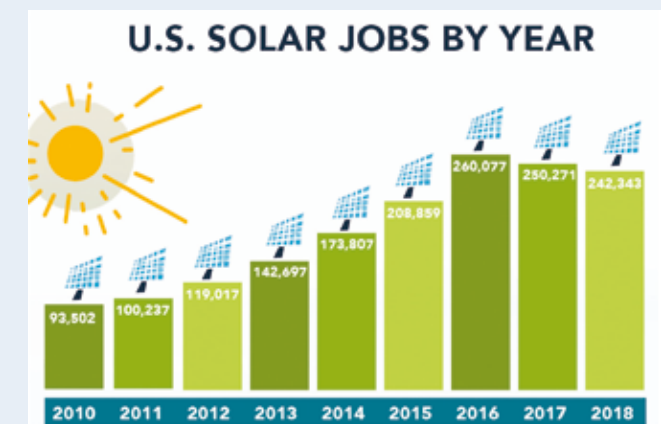
Users can register using LEED Online, review the LEED v4.1 Beta Guide, and download the LEED v4.1 rating system. The latest education videos and live online webinars featuring USGBC subject matter experts are also available. All sites are accessible from <https://new.usgbc.org/leed>. **GB**

## Solar Job Losses and Gains Vary Widely by State

Although jobs are down nationally, many areas continue to show strong growth.

AFTER SEVEN STRAIGHT YEARS OF JOB GROWTH, the number of workers in the solar industry dropped by 8,000 in 2018, the second consecutive year of decline. According to the *National Solar Jobs Census 2018* report by the Solar Foundation, the 3.2 percent decrease stems from a slowdown in installed solar capacity and negative policy changes in some states.

But 29 states actually gained jobs during 2018, including many with emerging solar markets. States with the highest employment gains include Florida, Illinois, Texas and New York. Other states that saw job growth include Ohio, Washington State, Pennsylvania, Minnesota, Virginia and Tennessee. In contrast, many of the traditional sun power leaders, including California, Arizona and New Mexico, reduced their ranks largely due to unfriendly business climates, the Foundation notes.



**Powering on through.** The solar industry overall lost jobs in 2018, but more than half of U.S. states saw photovoltaic employment numbers grow, and the trend is expected to reverse in 2019.

"The nationwide jobs decline is certainly disappointing news, and it reflects the importance of sound policies to drive solar energy growth," says Solar Foundation President and Executive Director Andrea Luecke. "In the future, our urgent task is to expand solar energy and storage across America and address the challenge of climate change. This will take exceptional leadership at the federal, state and local levels."

Luecke adds that the industry's long-term trend remains very positive. Declining solar energy costs over the past decade have driven up industry employment by 159 percent or 150,000 jobs nationwide since 2010. That number is expected to rise by 7 percent this year to more than 259,000 jobs—up from 242,000 at the end of 2018—as the industry makes its way through a backlog of utility-scale projects, and new policy incentives take effect in key states.

The National Solar Jobs Census is available at <https://SolarJobsCensus.org>. **GB**



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**Where's the waste?** HVAC systems will be a big part of what 16 different groups will be studying to improve household energy efficiency.

## DOE Launches \$11.5M Energy Improvement Project

Sixteen organizations and colleges will tackle energy inefficiency in building design.

THE DEPARTMENT OF ENERGY (DOE)'s Building Technologies Office (BTO) is investing up to \$11.5 million in 16 projects to drive innovation, and early-stage research and development to improve energy performance of building envelopes and heating, ventilation and air conditioning (HVAC) systems in American homes. In addition, projects will address key challenges impacting building industry design and construction practices.

The funds are being allocated to BTO's 16 "Building America FOA" award winners. Funding Opportunity Announcement (FOA) award funds were distributed among three research topic areas, which include baseline in-situ fault analysis in residential HVAC systems, integration of advanced residential building envelope and HVAC systems, and gap analysis of building industry standard practices.

According to the Office of Energy Efficiency and Renewable Energy, homes account for more than 20 percent of total U.S. energy consumption and 37 percent of total U.S. electricity use, with household annual energy bills totaling \$240 billion. For the average American household, that amounts to more than \$2,000 in energy bills each year. More than 40 percent of this household energy use goes to heating and cooling homes. While building materials and HVAC equipment efficiency have improved over recent decades, a number of challenges continue to result in significant energy losses. The 16 project teams selected by BTO will study these challenges, testing and validate emerging energy-efficient technologies and techniques aimed at addressing them.

A complete list of BTO award winners can be found at <https://bit.ly/2TL8krd>. **GB**



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It's time to rethink where we live, what we buy and how we can take care of our future selves.

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HERE'S A SAMPLE OF WHAT'S INSIDE

“There’s a huge disparity between those who can afford to choose and those who can’t. What option do you have if you can’t afford to design and build your own development?”

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**ON THE COVER**  
**THE HOT 50**

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2019 Editors' Choice  
**GREEN BUILDER**  
**HOT50**  
**PRODUCTS**

# 2019 Editors' Choice **GREEN BUILDER** **HOT50** **PRODUCTS**

This year's product picks trend toward renewable energy and fine-tuned heating and cooling systems.

BY GREEN BUILDER STAFF

**N**EVER LET IT BE SAID that there's nothing new under the sun. One-fourth of *Green Builder's* 2019 Hot 50 Products have direct ties to solar energy, from shingles to portable power plants. It seems fitting that the most-prominent example of sustainability should be one of the most important trends shaping the built environment. But our annual roster also has plenty of items representing other facets of high-performance building—household fixtures, heating and cooling devices, insulation tools and smart technology are just a few categories to make the cut. Selections were based on the product's innovative design, sustainable manufacture, durability, degree of innovation, and potential energy or water savings.

Here's to another year where great building science meets good design—50 products that add to the pedigree of the nation's best built homes.





### ▲ American Standard VorMax Plus Self-Cleaning Toilet

The *VorMax Plus* toilet from American Standard is a high-efficiency unit that cleans and freshens the bowl each time the toilet is flushed, reducing the elbow grease needed for one of the least-favorite household chores while also saving water. But the product's single-jet water release also solves the biggest issue with high-efficiency toilets: bowl cleaning and bulk removal performance during a flush.

*VorMax Plus* has earned WaterSense certification from the U.S. Environmental Protection Agency (EPA) for providing high performance while using 20 percent less water than traditional 1.6 gallons per flush (gpf) toilets. It has achieved the highest bulk removal score on the Maximum Performance (MaP) test, an independent report of toilet performance, successfully flushing 1,000 grams (2.2 pounds) using 1.28 gpf. The toilet's flush alone has been independently verified to clean the bowl two times better than conventional toilets.

An even greater benefit is the toilet's ability to infuse pleasant-scented *VorMax Plus FreshInfuser* cleaner—conveniently hidden in an easy-to-access compartment in the seat—into each flush to help prevent hard water buildup and stains, keeping the bowl clean and fresh. All of these features combine to make the first flush the only one needed to get the job done.

For more information: <https://bit.ly/2TFOPge>

### ► Delta Electronics BreezIntegrity Ventilation System

As the industry's first dimmable LED flat panel light fixture with ventilation, the *BreezIntegrity ITG100ELED* from Delta Electronics complements other edge-lit LED lighting in the home, while the 100-CFM exhaust fan maintains proper indoor air quality in bathrooms up to 100 square feet. The fixture is Energy Star certified and quietly operates at just 1.5 sones to eliminate homeowner noise complaints. It's also UL listed for installation over the tub or shower when installed with a GFCI-protected branch circuit.

Utilizing brushless DC motor technology, the *BreezIntegrity* lasts up to two-and-a-half times as long as AC motor alternatives. The self-compensation feature of the DC motor senses static pressure and adjusts its speed to assure optimal CFM output and proper air movement over long duct runs.

*BreezIntegrity's* lighting is also designed to last, with the homeowner-preferred 13-watt dimmable LED light capable of maintaining an output of 1,000 lumens for up to 30,000 hours—three times as long as CFL alternatives. Color temperature of 3,000 K emits a soft, warm white light. Wiring with a dimmer switch allows homeowners to adjust the intensity of the lighting for added ambiance.

For more information: [www.deltabreez.com/ITG100ELED.php](http://www.deltabreez.com/ITG100ELED.php)



## BATHROOM FIXTURES



### ◀ Niagara Conservation Bi-Max Fixed-Mount Showerhead

Call it "conservation with a twist." Niagara Conservation's ultra-efficient *Bi-Max Showerhead* provides users with a luxurious shower while using next to nothing in water. The product features two adjustable spray settings for optimal task performance and maximum water savings. *Bi-Max's* even, vacillating spray—achieved through 1.0 gallon-per-minute (GPM) or 1.5 gpm settings—matches that of other showerheads using twice as much water.

The secret lies in the company's *EQUIFORCE* technology, a pressure-compensating design that provides constant water output regardless of water pressure. At low pressure, water is allowed to flow through three holes in the center of the compensator. As water pressure increases, the force presses down on the compensator, causing it to flex and seal off, directing water to only flow through the center holes. The shape and density of the rubber help maintain a level flow rate as the pressure increases.

Independent reviews praise the showerhead's efficiency, both in keeping a shower feeling like one even with ultra-low flow, while also saving water and lowering monthly bills—especially for large households or ones with people who like to take their time cleaning up.

For more information: <https://niagaracorp.com/uhet/#showerhead>

## ENERGY PRODUCTION, STORAGE AND CONTROL



### ▲ Brooklyn Solar Company Solar Canopy

When thinking of solar panels, many consumers worry that the product will detract from a home's appearance. The *Solar Canopy* from Brooklyn Solar Company gives homeowners a way to go solar in a style that's easy on the eyes. The sleek solar panels sit atop a aluminum frame that can be raised up to nine feet and mounted on rooftops or set on the ground—eliminating the panels from view, while also providing a carport or shaded living.

The *Solar Canopy* allows installation of a photovoltaic system that is usually not subject to the same regulations faced by most solar power vendors. It also offers an easier way to bring green energy to residences with flat roofs, particularly in large cities. Each canopy typically features 18 to 24 solar panels, and each panel generates about 360 watts of energy. The homeowner saves about \$1,500 in electric costs annually. And, the entire unit can be installed in 1 to 2 days.

In addition to rooftops, the unit can be installed to create a carport or yard pergola. They come in a variety of colors to further blend into the background. And, state and federal incentives can cut install costs by up to 75 percent—making a product like this a bright idea indeed.

For more information: <http://brooklynsolarcanopy.com>



### ▲ EcoSmart Solution Geothermal Energy System

EcoSmart Solution offers an answer to a longstanding question: "How do you build affordable, sustainable homes and communities?" The answer is found in a geothermal energy system. But although geothermal energy is considered a very practical and effective way to naturally heat and cool a home, upfront infrastructure costs make the system cost prohibitive. Many homebuyers are priced out of their ability to participate in sustainable living.

EcoSmart Solution uses an innovative and community-wide geogrid to combine geothermal heating and cooling into a system that cuts a home's power consumption by 60 to 70 percent. The process utilizes a loop field that enables geothermal-generated power to be shared among multiple residences, keeping costs down for owners. It's installed at the start of development as a part of the community's infrastructure, making it possible for builders to add on homes to the system as they are built—instead of installing a separate system for each unit—dropping project development costs dramatically.

High-efficiency appliances, smart home devices and photovoltaics can generate the additional energy needed to power a home. This can make homeownership much more affordable for all potential buyers.

For more information: <http://ecosmartsolution.com>





### ▲ SolarEdge Technologies EV-Charging Single-Phase Inverter

The *EV-Charging Single-Phase Inverter* from SolarEdge Technologies advances development of holistic smart energy homes. Installers and builders can cost- and time-effectively design and build homes that embrace smart energy production and consumption. For example, the inverter reduces the workload and costs of separately installing two standalone products—an electric vehicle (EV) charger and solar inverter. This saves space on the main distribution panel and eliminates possible panel upgrades.

Meanwhile, the inverter allows consumers to further decrease their carbon footprint by allowing EV drivers to charge their cars from renewable sources. SolarEdge has also succeeded in increasing charging speeds compared to other comparable EV chargers on the market. Further improving the EV-charging experience, the inverter features an easily replaceable cable and connector, one of the most common failure points of EV chargers.

SolarEdge provides its inverter with an EV-ready option so that is future-ready for new EV purchases or replacement. SolarEdge's monitoring app also allows for remote charging or prescheduling. In the future, the app will include features such as demand response readiness and weather forecasts.

For more information:  
<https://bit.ly/2D7M9m5>



### ◀ Panasonic Solar HIT+ N340 Solar Panel

The 96-cell *HIT+ N340* solar panel provides a powerful combination of increased module efficiency, energy savings and durable long-term performance. Featuring a 20.3-module efficiency and 340 watts per panel, *N340* delivers an advanced renewable energy source with zero emissions for any home. A temperature coefficient rating of -0.258 percent/°C, one of the lowest in the world, helps generate greater electricity output on the hottest days.

*HIT+N*-type solar cells result in extremely low light induced degradation (LID) and zero potential induced degradation (PID), which supports reliability and longevity throughout your system lifecycle. This technology reduces annual degradation to 0.26 percent compare to 0.70 percent in conventional panels, guaranteeing more power output over the long haul. The product is guaranteed a minimum 90.76 percent rated power output after 25 years, substantially more than other panels.

There's also an enhanced frame design that offers increased durability and strength, being able to handle loads of up to 5,400 Pa. Also, the water drainage system gives rainwater and snowmelt a place to go, reducing water stains and soiling. Less dirt on the module means more sunlight getting through to generate power. And, *N340*'s design maximizes limited roof space and provides greater electricity production on any home and roof design.

For more information: <https://bit.ly/2u9uo0e>

## ENERGY PRODUCTION, STORAGE AND CONTROL

### ▼ Heliomotion Home Solar Power Plant



In order to get maximum output from the sun, solar panels should always be directed straight towards the sun—not only at noon, but whenever photovoltaic energy is needed. The *Heliomotion Home Solar Power Plant* constantly tracks the sun from sunrise until sunset, a concept that resembles that of large utility solar stations. It provides private homes with an extremely efficient, affordable and easy way to generate their own renewable energy.

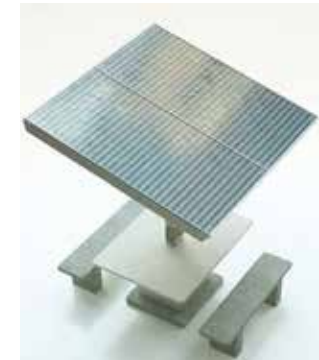
*Heliomotion Home Solar Power Plant* finds the sun's position using GPS. The tracker rotates 180 degrees along the horizon and 20 to 70 degrees vertically. Its dual-axis tracking performs with a single motor, leading to lower energy consumption. The product is available in a solar-paneled model (PV-2M), with two 300-watt panels that generate 700 to 1,350 kilowatt hours per year, and a panel-free version (PV-2) for those who want to use their own solar panels.

The *Home Solar Power Plant* is designed to be easily assembled and installed in less than a day by an installer or the buyer, with help from an experienced electrician. The product is delivered as a complete installation kit on one pallet, including a detailed, illustrated installation manual.

For more information: <https://heliomotion.com>

### ▼ Sunbolt Velocity Outdoor Solar Charging Station

Busy people often need last-minute charging for their electric devices. In lieu of searching for a wall outlet in a building, the new *Velocity* outdoor solar charging station from Sunbolt enables users to sit comfortably outside while rapidly recharging any of their devices. Need a charge at night? No problem. A brilliant, non-glare LED lighting system illuminates the table for nighttime use.



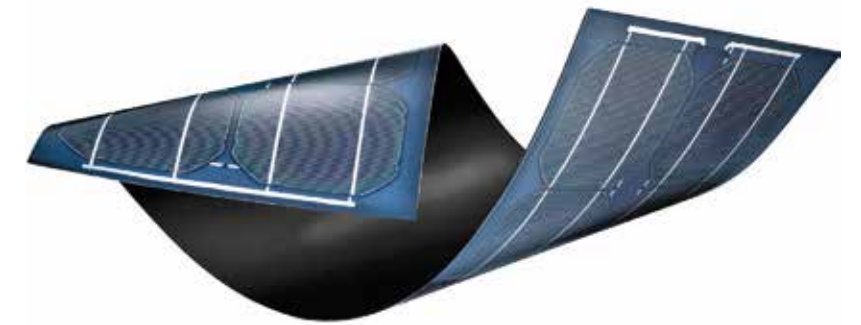
The *Velocity* is a lower-cost, sit-down, outdoor workstation with a structural steel frame, a concrete base, a marine-grade polymer tabletop, and a 660-watt DC solar array.

The off-grid solar power design delivers dependable year-round charging power, even in the worst-case weather conditions, and will charge 75-100 mobile devices a day in typical usage, with two 120-volt and four USB outlets.

In addition, the optimized system design includes high-quality UL-listed solar power components for safe and trouble-free performance, and the ADA-compliant design comfortably seats four to eight people.

The *Velocity* is built as a fully engineered commercial-grade structure, hardened for public use and low maintenance. It has a minimum service life of 30 years.

For more information: <https://gosunbolt.com>



### ▲ Sunflare Sun2 Solar Modules

Weather and machinery are not best friends of solar technology. Rooftop-mounted panels can take a beating from storms; ones mounted on structures such as carports can be damaged if drivers are bad at parking their cars. Sunflare solves that problem with an ultra-thin, flexible module that bends but doesn't break in tough situations.

The *Sun2* module consists of micrometers-thin layers of steel, copper, indium, gallium and selenide (CIGS) semiconductors that combined are capable of generating 10 percent more energy than traditional photovoltaic modules due to better low light and midday performance, combined with a lower temperature coefficient. Each solar cell has its own bypass diode, keeping energy output high when even a small part of the panel is in shade.

The product has a less energy-intensive creation process—about 80 percent lower compared to silicon—because there is no need for a frame, glass panel, purification of silicon or a mount. Less water is used during production, and what is used is recycled. Toxic chemicals, such as lead, cadmium, hydrofluoric acid or hydrochloric acid, are avoided.

Modules are also lighter—about 11 pounds each versus 40 for traditional crystalline silicon panels—making installation much less labor intensive for installers.

To learn more: <http://sunflaresolar.com>

### ◀ LG Electronics Energy Storage System (ESS) With Expandable Battery Pack

LG Electronics' new energy storage system creates a flexible energy management solution for homeowners wanting a more energy-efficient and greener home environment. LG's ESS features an integrated smart energy management system (EMS) that enables customers to control their electricity bill through self-consumption of solar and time-of-use rate smart scheduling. This allows for less reliance on the energy grid during peak energy consumption hours, when time-of-use electricity rates are often highest.

The system also includes an off-grid mode in the event of a power outage. In that case, LG ESS can each store up to six hours of energy. The system can also be scaled up for more storage through pairing with an expandable battery pack and is covered by a 10-year warranty. What's more, LG's mobile app, *EnerVu*, enables the homeowner to monitor the system's energy flow even while on the go.

LG ESS are compatible with virtually all solar-powered homes. The product is available in an AC-coupled 5.0-kW system for homeowners who already have solar panels of any type on their homes, and a DC-coupled 7.6-kW system as part of a new installation of LG solar panels.

For more information: <https://bit.ly/2HmMbtK>



# FLOORS, WALLS AND SURFACES



## ▲ Armstrong Flooring Paragon with Diamond 10 Technology Solid Hardwood

Hardwood floors can last for generations, which makes hardwood a natural and sustainable flooring option. Armstrong Flooring's *Paragon* is made from 100 percent solid Appalachian hardwood with patent-pending *Diamond 10 Technology*, a flooring innovation that incorporates cultured diamonds to create a powerful layer of scratch protection without clouding the beauty of the hardwood underneath.

Some competitor hardwood floors incorporate aluminum oxide into the bottom coating layer, where surface traffic does not reach, leaving the top layer vulnerable to damage. *Diamond 10 Technology* forms a hard traffic-and-wear-resistant barrier on the surface that also protects the wood from soils and stains. *Paragon* is built to endure real-life demands, such as active kids, pets and heavy foot traffic.

Most raw materials are locally acquired, and 90 percent of total volume is manufactured in the United States. This reduces the company's environmental footprint by making deliveries shorter, meaning less impact to air quality.

For more information: <https://bit.ly/2j5eSRq>



## ▲ Kohler WasteLAB Ann Sacks Crackle Collection

With Kohler WasteLAB's *Crackle Collection*, a line of repurposed tile, what was once on the floor now clings to the walls. The company, along with stonework specialist firm Ann Sacks, has developed a product made almost entirely of recycled pottery cull, and factory sand and dust. Available in sizes from 4-by-4 inches to 6-by-12 inches, the *Crackle* tiles offer a stylish way to dress up vertical surfaces without a large environmental footprint.

Before it is fired, discarded clay is pressed, WasteLAB artisans hand-cut each tile and remove excess clay around the edges. An interactive glaze is then applied, which has a unique composition designed to pool and break over the textured surface during firing. A resulting delicate crackle occurs after the firing that carries across the tile face, adding to the dimensional quality and artful visual effect. The tile is available in a half-dozen colors suitable for interior use.

The *Crackle Collection* is the result of initiatives developed as part of Kohler's award-winning *Innovation for Good* program, which develops and implements sustainable business solutions to some of the most pressing problems related to safe water, safe sanitation and reliable power.

For more information: <https://wastelab.kohler.com>

## ► mnmMOD Modular Home System

mnmMOD's self-named panelized building system offers a way to construct a home without wood, while ensuring good indoor air quality. The technological brainchild of Santa Monica-based architectural design studio Minarc, *mnmMOD* offers the residential building industry an affordable and fully customizable alternative to traditional building materials and techniques.

Consisting of a blend of recycled steel and EPS insulation, *mnmMOD* building panels are 100 percent wood-free and are 40 percent more energy efficient than traditional housing components. They contain no dyes or formaldehydes, and emit no volatile organic compounds (VOCs). The panels also prevent mold and termites from destroying a building and can withstand fire—a particularly attractive feature for residents in high fire-risk areas.

*mnmMOD* panels are customized to specific building plans and can be delivered directly to construction sites across the United States. Installation is simple—all that's needed is a screw gun—meaning faster construction, lower labor costs and almost zero waste. The highly energy-efficient panels also exceed requirements of Title 24. And, the product is completely recyclable when it reaches end of life—whenever that happens to be.

For more information: <http://mnmmod.com>



## ► Bosch Inverter Ducted Split 2.0

The *Bosch Inverter Ducted Split (IDS) 2.0* is Bosch's premium air-source heat pump. With up to 20.5 seasonal energy efficiency ratio (SEER), this heat pump has a full Energy Star-compliant product range. The accompanying air handler includes an x13 ECM blower with two-stage fan control for enhanced dehumidification, and an all-aluminum coil for superior corrosion resistance.

With 10.5 heating seasonal performance factor (HSPF) and heating operation down to four degrees below zero, this heat pump offers highly efficient operation, even in cold-climate applications. The *Bosch IDS 2.0* outdoor unit can integrate with Bosch's 96 percent gas furnace and cased coils for an exceptionally efficient dual heating and cooling system.

Other key selling points include its ultra-quiet operating noise—thanks to its foil-faced air handler cabinet insulation, silent blade technology, sound isolating mounts and outdoor condensing section placement—and its compatibility with smart thermostats that can help it learn a homeowner's preferences and adjust temperatures accordingly (and yes, the unit is compatible with any traditional thermostats). There's also the smooth, gradual upgrade to a preferred environment—an action that prevents the wear-and-tear-inducing spikes in energy use that are common with other units.

For more information: [www.boschheatingandcooling.com](http://www.boschheatingandcooling.com)



## ◀ Lennox Variable-Speed Ultra-Low NOx Gas Furnace

The *Lennox SL297NV Variable-Speed Ultra-Low NOx Gas Furnace* helps combat the health and environmental problems that NOx gas creates, and some of the installation problems faced by builders. The unit meets those requirements where local governments and municipalities have lowered the NOx emission limits for natural-gas-fired, fan-type residential central furnaces, such as those within certain parts of California.

The *SL297NV* helps make the air cleaner, and also provides environmentally friendly home-heating options for homeowners who want an earth-friendly, quiet and efficient product and are looking to avoid a fine for not being compliant with the new regulations. It will also keep the equipment of the homeowner's house compliant with the standards by lowering NOx emissions by 65 percent compared to standard low NOx furnaces. This, in turn, making the unit less damaging to the environment.

This furnace is designed with exclusive *SilentComfort Technology*, which is achieved by utilizing variable-speed technology—in this case, a high and low speed. The low-speed setting is adequate to meet household-heating demands approximately 80 percent of the time, meaning the furnace is much quieter than a conventional single-stage furnace. In addition, the variable-speed motor ramps up gradually, eliminating the sudden "kick" or blast of air upon startup.

For more information: <https://bit.ly/2yOTa94>

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# HEATING, COOLING AND WATER HEATING

## ► VentCool Vista-Series Whole-House Fan

VentCool whole-house fans are powerful, energy-efficient, quietly performing residential cooling systems that can keep a home comfortable for one-tenth the cost of a traditional air conditioner. The latest model, the *Vista* series, includes now allows owners to decide where the house fan should be used.

The fan's VentCool-exclusive *PowerSeal Motorized Damper* is an Insulated R-49 drive seal system designed for a secure, precise and insulated seal between the attic and the living space when operation of whole-house fan is not desired.

*Vista* also features the highly efficient *Electronically Commutated Motor* (ECM) fan motor, which operates at an optimally low cfm/watt draw, consuming up to 90 percent less energy than other A/C units; a *Wall-Mounted Speed Control*, a 10-speed device with an eight-hour timer to set the desired operation period; and an *Acoustic Silencer Duct*, with seven feet of insulated flexduct for quieter sound operation. VentCool fans also qualify for California's Title 24 energy credits, as well as other state and federal incentives.

For more information: <https://www.ventcool.com>







## HEATING, COOLING AND WATER HEATING



### ▲ Navien NFC-Series Stainless Steel Fire Tube Combi-Boiler

Navien's *NFC*-series stainless steel fire tube combi-boiler supplies improved energy efficiency over the company's already renowned line of space heaters. The unit is available in two sizes: *NFC-175* (175,000 Btu/h) and *NFC-200* (199,900 Btu/h), with enough heating input for up to a 3,500-square-foot home and continuous domestic hot water supply for up to three bathrooms, or a dishwasher and three showers simultaneously. This makes them effective for retrofits and new installations in single-family homes, multi-family houses and light commercial buildings.

Navien *NFC* combi-boilers include a patented, in-house designed and manufactured heat exchanger, advanced controls offering intuitive user navigation, and a built-in domestic hot water (DHW) module consisting of a pump, flat plate heat exchanger, three-way valve, mixing valve, water adjustment valve and auto water fill valve.

The boilers are also Energy Star certified, offer easy field convertibility from natural gas (NG) to propane (LP), have low NOx < 20 ppm SCAQMD certification, and provide easy access to all serviceable components. Supplied accessories include a *NaviClean* magnetic filter, an isolation valve kit and an *NFC* primary loop manifold for easier installation.

For more information: <https://www.navieninc.com/home>

### ◀ Mitsubishi Trane Electric HVAC US MLZ One-Way Ceiling Cassette

The *MLZ One-Way Ceiling Cassette* is an indoor unit designed to help homeowners achieve comfort and optimize energy usage through zoning. With a sleek, narrow-body design that fits between standard 16-inch joists, the *MLZ* enables easy creation of zones for comfort and usage needs, providing energy savings for existing homes and new construction.

Utilizing an inverter-driven compressor, the *MLZ* provides the space with the exact amount of energy to cool or heat an area without turning the system on and off. This advancement has transformed the HVAC industry by providing temperature regulation at a fraction of the energy normally required. This operations method is up to 40 percent more efficient than traditional cooling and heating systems.

In addition, Mitsubishi Electric Trane's system parts are made from a significant percentage of recyclable materials, which help to reduce the waste in landfills. The *MLZ* also features long-life washable filters that have advanced filtration, providing occupants with improved indoor air quality (IAQ). The efficient operation and sustainable materials of the *MLZ* make the unit a standout in terms of green residential building products.

The unit also syncs to Mitsubishi's *kumo cloud* app and web service, which intelligently manages the *MLZ* to customize airflow direction and temperature.

For more information: <https://bit.ly/2SMz0sV>

### ▼ LG Electronics Multi V S Five-Ton Heat Recovery System

As the U.S. market's first single-phase variable refrigerant flow (VRF) five-ton heat recovery system, LG's *Multi V S* is a compact heat recovery unit designed to provide excellent energy efficiency and the versatility of simultaneous heating and cooling up to 12 zones. With a smaller capacity (60,000 Btu/h cooling; 64,000 Btu/h heating), compact design and single-phase power, the *Multi V S* helps builders increase energy efficiency and lower energy costs without sacrificing comfort. *Multi V S* also features LG's high-efficiency inverter scroll compressor, allowing the unit to provide cooling capabilities in ambient temperatures up to 122 °F and heating operation down to -13 °F.



The *Multi V S* is a single refrigerant circuit that connects many indoor units to one outdoor unit requiring only single-phase power while providing exceptional, personalized comfort through simultaneous heating and cooling. *Multi V S* efficiently heats and cools any space, providing improved humidity control, individual set points per indoor unit, and a very quiet comfort experience in addition to energy efficiency and reliability. The system is also easy to install and maintain, and has low lifecycle cost compared to other systems on the market today.

*Multi V S* also features a new biomimetic fan design that draws from nature's design and enables the unit to operate more efficiently and increase airflow while reducing the perceived noise level by approximately 20 percent.

For more information: <https://bit.ly/2CiwiTV>

## INDOOR AIR QUALITY AND WATER QUALITY



### ▲ Kaiterra Sensedge

The ability to access real-time information is integral to ensuring healthy indoor air quality. Kaiterra's *Sensedge* enables users such as homeowners, architects, owners, developers and property managers to optimize air quality control and healthy building design to ensure a comfortable and healthy environment for occupants.

*Sensedge* offers a complete indoor air quality monitor for particulate matter (PM2.5), total volatile organic compounds (TVOCs), carbon dioxide, temperature and humidity, and includes a touchscreen display. Users can access historical data, helping to inform building design, construction and operations.

Unlike most air quality monitors on the market that test only two or three levels of pollutant concentration and use only a handful of these data points in the calibration process, *Sensedge* uses more than 6,000 individual measurements.

The *Sensedge* is also easily installed in any new or existing interior, and maintenance is uncomplicated due to replaceable sensors and a built-in notification system—with no calibration necessary. Sensors may also be customized for specific projects.

For more information: <https://kaiterra.com>

### ▼ Awair Omni Indoor Air Quality Monitor

An advanced method of tracking indoor air quality has expanded its reach. Awair's *Omni* features enterprise-grade sensors that track the key factors of air quality—temperature, humidity, CO<sub>2</sub>, volatile organic compounds, chemicals and fine dust—and provides actionable insights that allow homeowners and multifamily building owners to create healthy, productive living and working environments.

*Omni* features a touch-sensitive LED display, can be mounted on a wall or stand, and includes a battery back-up to prevent loss of data. The dashboard provides analytics of a building's overall air quality as well as that of individual rooms. A score between 0 and 100—worst to best—is then generated that identifies the quality of the air. Awair also provides personalized recommendations to improve the air's health and safety.

Data history can be easily accessed and exported, which is especially helpful for building owners aspiring to achieve LEED, WELL or RESET certification. Customized alerts and notifications can also be set up for when building conditions fall out of the desired air quality range.

Awair also works with other devices such as Nest, Alexa and Google Home, to automatically keep air clean and healthy.

For more information: <https://getawair.com>





## INDOOR AIR QUALITY AND WATER QUALITY



### ▲ Panasonic EcoSolutions *WhisperFresh Select* Fresh Air Supply Fan

Panasonic's *WhisperFresh Select* supply fan offers builders, remodelers and homeowners a filtered fresh air solution for tightly built, energy-efficient homes. The fan can operate as a standalone fresh air supply solution or can be paired with Panasonic's multi-speed exhaust fans for a whole-house indoor air quality (IAQ) solution, bringing fresh, filtered air from outside into the home, and exhausting stale, moist, polluted air out of the home to create balanced ventilation.

Equipped with the built-in *Pick-A-Flow Airflow Selector*, the *WhisperFresh Select* enables the user to customize the ventilation fan for nine different CFM settings (50-60-70-80-90-100-110-130-150), ensuring it meets required airflow settings with the turn of a dial. The ability to choose the required CFM level gives builders and contractors the flexibility and assurance that one fan will satisfy a range of ventilation design requirements that meet code and perform as promised. The *WhisperFresh Select* can be used to comply with many green building standards, including LEED, ASHRAE 62.2 and California's Title 24.

Additionally, the fan can integrate with central HVAC and enhances ductless systems for maximum IAQ benefit. *Whisper Fresh Select* was recognized as an ENERGY STAR Most Efficient product for 2018.

For more information: <https://bit.ly/2D78cJF>



### ▲ Voltea *DiEntry* Water Purification Unit

Voltea's first residential product, *DiEntry*, addresses the major water issues—quality, taste and waste—by using the company's trademark *Capacitive Deionization (CapDI)* technology to "tune" water to meet the needs of the homeowner and community without using salt or chemicals. Designed for households of three or more, *DiEntry* and *CapDI* are also an economical, environmentally responsible alternative to traditional technologies such as reverse osmosis.

With *CapDI*, water flows between electrodes that remove oppositely charged salts and water hardness, reducing environmental impact and lowering energy costs. Its patented "tuning" feature allows water softening to fit specific tastes and preferences, while its anti-scaling effect promotes the longevity of valuable appliances.

For builders, *DiEntry* offers a way to provide fundamentally better water flowing into and out of their housing projects. *DiEntry* is also smaller, and uses and wastes less water than other traditional water treatment systems. Its design also makes it easy to comply with current and future sodium chloride discharge regulations.

Homeowners benefit from long-term savings in water and energy usage as well as being in immediate compliance with community restrictions on water usage and runoff from traditional water-softening systems.

Voltea's patented technology and cross-industry impact earned it the Breakthrough Water Technology Company of the Year Award at the 2018 Global Water Summit in Paris.

For more information: <http://voltea.com/products>

## INSULATION, AIR SEALING AND LEAK PREVENTION



### ▲ AeroBarrier Aerosol Envelope Sealing Process

*AeroBarrier* is the first envelope sealing technology that can be dialed in for specifically targeted results—from basic regulatory standards to the tightest Passive House levels of air exchange. As such, it replaces a complex, multi-stage, multi-product process yielding uncertain results with a simple, highly effective single-step process with guaranteed results.

The interior air sealant can seal all building envelope leaks of up to one-half inch in diameter. Using automated sprayers, *AeroBarrier* passes through gaps in the building envelope and accumulates on the edges of the openings. In less than three hours the sealant fills all the gaps. The sealant itself dries in about 30 minutes, allowing work to resume after a short break.

Meanwhile, the computer-controlled process allows builders to monitor actual level of tightness as the sealing process is taking place. At the end of the process, a final report provides details of before and after results—no retesting and measuring required.

*AeroBarrier* is based on a waterborne acrylic that is Greenguard Gold Certified and has been tested according to various ASTM standards and NFPA 285 for fire spread, smoke production, adhesion, antifungal properties, tensile strength and more. The sealant is also low in volatile organic compounds (VOCs) and has no offgassing.

For more information: <https://aerobarrier.net>

### ► Flo Technologies *Flo by Moen* Water Monitoring and Leak Protection System

Each year an estimated 1 trillion gallons of water are lost due to leaks—enough water for Los Angeles, Miami and Chicago for an entire year. That wasted H<sub>2</sub>O also results in more than \$9 billion in water damage claims reported annually by U.S. insurance agencies. Enter Flo Technologies with the *Flo by Moen* water monitoring and leak protection system, an always-on detector of leaks or forthcoming problems.

Installed inline, *Flo* monitors all water going into the home. The device has three sensors that actively monitor water flow, pressure and temperature. It's capable of discovering a leak of any size—from small drips to burst pipes—for which *Flo* can turn off the water supply to limit water waste and damage to the home. About 60 percent of users discover a leak that they did not know their home had, leading to about 2.5 million gallons of water saved during *Flo by Moen's* first year on the market.

Meanwhile, alerts are sent to the owner's phone so they can take control of their home's water wherever they are. Users may also set water consumption goals, monitor daily usage, and turn water on and off remotely. *Flo by Moen* currently integrates with Amazon Alexa, Google Assistant and IFTTT.

For more information: <https://meetflo.com>



### ◀ Havelock *Loose Fill Wool* Insulation

Anyone searching for an alternative to traditional fiberglass insulation has an all-natural option: "true" wool. Havelock's *Loose Fill Wool Insulation* offers a barrier against moisture and mold, provides thermal control, sound insulation and fire protection, and makes for an all-natural air filtration tool. It has no synthetic mix or chemical binders, and does not add pollutants to indoor air.

Havelock's product consists of knobs or balls that more completely fill a space to avoid slumping, and enable it to maintain its original R-value. R-values can

range from 7 to 100, depending on the selected thickness. Meanwhile, the product absorbs and desorbs relative to 65 percent humidity in term of moisture management.

As a keratin, wool does not support mold growth. It also improves air quality through passive filtration, absorbing volatile organic compounds (VOCs), nitrogen oxide (NO<sub>2</sub>) and sulfur dioxide (SO<sub>2</sub>). *Loose Fill Wool Insulation* can easily be installed by hand or machine in open areas, enclosed walls, ceilings and floors, and should last the life of the structure.

For more information: <https://havelockwool.com>





## ◀ Owens Corning Pure Safety High-Performance Insulation

Owens Corning's *Pure Safety* high-performance insulation is the first to be certified "Asthma and Allergy Friendly" by the Asthma and Allergy Foundation of America. This is largely due to its 65 percent diminished dust output, plus mold and mildew resistance. The product is also UL Environment Greenguard Gold Certified for its low chemical emissions.

*Pure Safety* is an all-purpose insulation suitable for interior and exterior walls, floors and attics. It installs easily, due to single, 93-inch-long batts that fill most wall cavities in one step. The product cuts easily and is not subject to crumbling or slumping. It's also no friend to fire, being Class A rated, achieving the lowest Flame Spread and Smoke Development ratings possible—0 and 0—when tested in accordance to ASTM E84.

The product also reduces noise by up to 50 percent, helping to keep distracting outside noise out and reduce inside noise from traveling room-to-room. Although the standard 15- by 93- by 3.5-inch batt carries and R-value of 15, *Pure Safety* is also available in sizes up to 24 by 48 by 10.5 inches, which has an R-38 rating.

For more information: [www.owenscorning.com/insulation/pure-safety](http://www.owenscorning.com/insulation/pure-safety)

## INSULATION, AIR SEALING AND LEAK PREVENTION



### ◀ Uponor Phyn Plus Intelligent Water Monitor

Uponor's *Phyn Plus Smart Water Assistant + Shutoff*

is an intelligent water monitor that attaches to the main water line of homes. Utilizing *Phyn*'s patented technology, including machine learning and artificial intelligence (AI), *Phyn Plus* measures tiny changes in pressure—240 times a second—to detect plumbing issues in real time. It can remotely shut off the main water supply to prevent costly damage. Early warning alerts can also prevent annoying but expensive mishaps, such as freezing-and-then-bursting pipes.

In addition to being a safe and reliable leak detection solution, the device helps eliminate water waste. *Phyn Plus* monitors a home's entire plumbing system and provides homeowners with unprecedented insight into how they use water. Usage trends can reveal how much a homeowner's irrigation, showers, washing machine, sinks and more are using.

*Phyn* can sync with Amazon *Alexa* and for water-controlling voice commands ranging from "How much water have I used today?" to "tell *Phyn Plus* to turn the water off." The system is compatible with a phone or tablet with iOS 9 or later, and Android 5 or later. And, the user can also monitor up to six different properties, controlling water shutoff wherever and whenever needed.

For more information: [www.phyn.com](http://www.phyn.com)



### ▲ Tstud Structural Framing System

The *Tstud* solves the No. 1 nemesis of the construction industry: How to "cost-effectively" minimize the transfer of outdoor climatic heat or cold from affecting the interior of a structure's ambient room temperature. The *Tstud* wall assembly, which uses two wood lumber members with an internal wood truss system made from dowels, provides a nearly complete (99.23 percent) thermal break through the wall—hot or cold. A built-in foam core gives the product three times the insulation of a conventional wood stud.

In straight down vertical testing, the product proved three times as strong as 2-by-6s and four times as strong as 2-by-4s. *Tstud*'s construction also makes it an effective mini header when used as a top plate: Only one *Tstud* is required, compared to two 2-by-6s or 2-by-4s in traditional framing. The product can also mean reduced use of an average of 56 studs and 2,000 fasteners per project—along with all the necessary labor to install them.

Replacing traditional framing with *Tstud* also helps homeowners reduce their utility bills by up to 24 percent for the life of the structure—easily covering the extra cost of building with the tool. And, the *Tstud* is fully International Building Code compliant for all of North America. It is available for use in all five hurricane zones and all six seismic zones.

For more information: [www.tstud.com](http://www.tstud.com)

## LIGHTING FIXTURES, CONTROLS AND SENSORS



### ▲ Eaton Z-Wave Plus Wireless Collection

Eaton's new *Z-Wave Plus Wireless Collection* of smart dimmers, switches and receptacles, offers improved cybersecurity and an expanded wireless communication range. The broad lineup of lighting controls includes a wireless universal dimmer, wireless accessory dimmer, wireless switch, wireless accessory switch and wireless duplex receptacle. All these devices feature *Z-Wave Plus Technology*, improved communication range, S2 security, lower power consumption and over-the-air updates.

The *Z-Wave Plus* wireless universal dimmer replaces regular switches to provide local and remote on/off, as well as dim up/down control for most common residential lighting loads. This includes LEDs up to 300 watts. Eaton's *Z-Wave Plus* wireless switch replaces regular switches to provide local and remote on/off control for most common residential lighting loads, including LEDs and certain motor loads. And, the *Z-Wave Plus* wireless duplex receptacle replaces regular receptacles to provide local and remote wireless on/off control of a single outlet.

All devices can be manually and remotely controlled by commands sent from a compatible *Z-Wave*-certified controller. Voice control is also enabled for these devices when used with a compatible controller and voice assistant such as Amazon *Alexa* or Google *Assistant*.

For more information: [www.eaton.com/connectedhome](http://www.eaton.com/connectedhome)

### ► Hardware Resources Lighted Power Strip by Task Lighting

There's always a need for more lights around the house, but not always the room for it. Task Lighting, a division of Hardware Resources, offers an array of power strip-based LED products to illuminate any cabinet space, including upper cabinets, inside cabinets and toe kick areas. Task's *Lighted Power Strips* are low-energy devices in recessed, lighted power, angled, lighted closet rods and 120-volt bar varieties.

The under-cabinet power strips, mounted against the wall, create extra space for appliances and additional plug outlets when needed. The beauty of the kitchen is no longer disrupted by a crowded backsplash. The strips are also tamper resistant to prevent injury from accidental insertion of a foreign object. They come in various colors, enabling them to blend into the background and not be as visible from elsewhere in the room.

Task Lighting also has products available with tape lighting with a protective IP65-rated micro-waterproof coating. This protects against potential damage that could result from water, cleaning or accidental strikes to the tape lighting.

For more information: [www.hardwareresources.com](http://www.hardwareresources.com)

### ▼ Amerlux Avista 7-Pin Light Engine

What if any streetlight could become a smart light? Lighting manufacturer Amerlux has that goal in mind with its line of light engines and related accessories, the latest of which, the *Avista Light Engine with 7-Pin Option*, can add Wi-Fi capability to streetlamps—an effective energy and money saver for new and old subdivisions.

Reminiscent of when phones became "smarter" with apps, the *7-Pin* adds dimming capabilities and access to cutting-edge sensors that can also wirelessly link to trash removal and street cleaning services, tracking of air quality, and even surveillance of criminal activity in a neighborhood. The device is a NEMA socket that can easily be installed by hand.

*Avista* light engines were designed for new construction applications and retrofits. They carry a longer-term benefit as well: The streetlights can become the perfect foundation for smart cities because they provide the power and the pole, which create a physical platform for the sensors. That makes for a strong selling point for any future subdivisions on a city's energy grid—and more jobs down the road for contractors.

For more information: [www.amerlux.com](http://www.amerlux.com)







### ▲ CertainTeed Apollo Tile II Solar Roofing System

Apollo Tile II solar roofing systems are engineered for seamless integration with new or existing asphalt shingle or concrete tile roofs. Each all-black solar module features 14 high-efficiency monocrystalline silicon solar cells that offer 63 watts of rated power, among the highest in the industry. Once installed, these solar roofing systems provide a sleek, low-profile aesthetic.

Installation is simple: Modules are fastened directly to roof sheathing using standard deck screws. Fastening points are covered by subsequent solar modules, the same way that traditional roofing is installed. Additional installer-friendly features include simple flashing, plug-and-play connectors and built-in wire management.

Apollo II systems are lightweight, about as many pounds per square foot as a typical asphalt shingle and significantly less than concrete tiles. They're also durable—rated to withstand loading of up to 250 pounds per square foot—and are certified for roofing safety (UL1703) and solar performance (IEC61215). With the highest wind rating available for roofing systems, they can be installed in any wind zone in the country. Water management features are built into the modules to enhance protection against water intrusion.

For more information: [www.certainteed.com](http://www.certainteed.com)

## ROOFING, SIDING AND DECKING

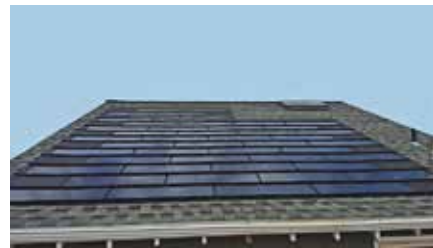
### ► Panasonic Solar HIT AC Series Solar Panel with Enphase Microinverter

Panasonic's HIT AC Series Modules combine the efficiency of its high-performing solar panels with the intelligence of Enphase IQ 7X Individual MPPT (Module-level Power Point Tracker) microinverters to deliver maximum power production from every roof size and shape. The all-in-one smart panel also results in easier installations, lower costs and higher return on investment.

Where most photovoltaic panels weaken and underperform in hot summer temperatures, AC Series Modules up the ante, thanks to an ultra-low temperature coefficient of  $-0.258\%/^{\circ}\text{C}$ . The company's HIT N-type solar cells, the N330E and N340, result in extremely low Light Induced Degradation and zero Potential Induced Degradation, meaning better reliability, power output and longevity throughout the system's lifecycle. Panasonic's industry-leading performance warranty guarantees a minimum solar panel power output of almost 91% after 25 years.

Installation and maintenance are also a breeze. There is no inverter installation and no DC wire management required. The built-in microinverter is factory mounted on the module, saving installation time, labor and money. And, the Enphase IQ 7X recesses into the frame of the AC Series Module, saving storage space, reducing trips up the ladder. Each microinverter is field replaceable, without the need to replace the entire solar module.

For more information: <https://bit.ly/2W4P9qc>



### ▲ Control4 CA-1 Automation Controller

As more homes become smart, it can become harder to keep track of all the pieces to the puzzle—the thermostats, smart locks, lights and cameras. Control4's CA-1 Automation Controller combines management of all of them into one device. Tailored specifically for smart home projects that desire lighting, comfort and security, the CA-1 includes Ethernet, Wi-Fi, Zigbee and serial communication, leveraging a database of thousands of third-party devices to ensure easy integration and interoperability.

An optional Z-Wave module enables the CA-1 to be compatible with a selected set of Z-Wave control devices including door, window, water, flood and temperature sensors, electrical outlets and dimmer outlet modules. The CA-1 also features Power-over-Ethernet (PoE) so it can be installed virtually anywhere with a single network cable. The CA-1 can handle more than 100 smart devices, and it can be run from a smartphone or tablet.

For more information: [www.control4.com](http://www.control4.com)

## SMART AND CONNECTED TECHNOLOGY

### ► Delta Touch<sub>2</sub>O Technology Touch-Enabled Faucets

Delta Touch<sub>2</sub>O Technology faucets combine finger precision with water conservation. With Touch<sub>2</sub>O, a simple tap anywhere on the spout or handle will start and stop the flow of water at the temperature where the faucet handle is set. The product also includes an automatic water flow shutoff after several minutes to save water. And, an integrated TempSense LED light shows water temperature, helping to prevent burns.

The product's sophisticated technology can distinguish the difference between a tap and grasp by measuring the duration of the contact with the faucet, helping to avoid unintentional turning on or off of the unit. The new faucet is also capable of voice activation through Amazon Alexa to turn faucets on and off, pour specific amounts and even warm up the water.

The Touch<sub>2</sub>O faucet operates on six AA or six C batteries but may also be powered with an optional A/C adapter.

For more information: [www.deltafaucet.com](http://www.deltafaucet.com)



### ► Resideo Technologies Honeywell Home T10 Pro Smart Thermostat

Resideo Technologies' Honeywell Home T10 Pro smart thermostat incorporates wireless RedLINK sensors to monitor temperature, humidity and motion, helping to balance hot and cold spots in a home. In addition, the T10 Pro carries a range of up to 200 feet, helping to provide whole-home comfort and faster installation by a contract. The thermostat can be connected to up to 20 smart room sensors.

Homeowners can focus comfort on the living areas during the day and bedrooms at night. For example, they can set a preferred temperature for a room or group of rooms and prioritize multiple rooms at different times of day, quickly switch which room is prioritized or use a voice assistant to change the set schedule. The thermostat also receives an alert if a room reaches a certain temperature, such as a nursery getting too cold at night.

Resideo enhanced the full-color touch display on the thermostat, allowing for full on-device setup and Wi-Fi connection using intuitive gesture controls, such as tap and swipe up or down. The thermostat also uses the same UWP standard wall plate as the remainder of Honeywell Home T-Series thermostats to reduce training requirements and deliver a consistent installation experience.

For more information: [www.resideo.com](http://www.resideo.com)



### ◀ LP Building Solutions SmartSide Smooth Trim & Siding

LP Building Solutions' SmartSide Trim & Siding is known for its advanced durability for longer-lasting beauty. Now, it's available in a smooth finish version that maintains its traditional wood appearance and environmental friendliness.

The primary ingredient in SmartSide Trim & Siding is wood, a sustainable and renewable natural resource. Using the product helps create demand for forest products, which gives landowners a financial incentive to keep working their forests instead of converting them for another use. SmartSide also limits waste, as every piece of siding leaves the mill ready-to-use.

The siding works and cuts like traditional wood. It requires fewer tools than fiber cement products, weighs less and is easier to carry. And, durability is a top factor: Treated with LP Building Solutions' proprietary SmartGuard process, one that is third-party certified to the Sustainable Forestry Initiative Standards, the product resists hail and impact damage, stands up to harsh weather—up to 200 mile-per-hour wind gusts—and thwarts damage from termites and fungal decay.

For more information: <https://bit.ly/2J22E4y>





# SMART AND CONNECTED TECHNOLOGY



## ▲ Rheem EcoNet Smart Thermostat

Rheem Manufacturing's EcoNet smart thermostat offers homeowners real-time control for optimal heating and cooling management capabilities. When paired with high-efficiency smart products, such as a Rheem Hybrid Heat Pump water heater, homeowners will save thousands of gallons of water per year and an estimated \$4,750 in energy costs over 10 years.

Performance benefits include a one-touch energy savings mode, which allows for a manual override of the programmed schedule to quickly reach efficiency preferences; a single-interface control of a home's HVAC and water heater products via a mobile app, touchscreen, or voice control through Amazon Alexa; active humidity and comfort monitoring removes excess moisture for healthier, more comfortable air; and seven-day scheduling that will reduce energy use in off-peak hours. Homeowners and homebuilders also benefit from lower HERS Index scores, and resulting energy and tax rebates with the EcoNet-enabled product line.

For more information: <https://bit.ly/2UQo9dy>

## ► Sense Energy Monitor

About the size of a smart phone, the Sense Energy Monitor installs in a home's electrical panel and uses machine learning to automatically sense the electricity in the house, tracking it in real time. In the Sense app, homeowners can tell how much energy they are using and how much it costs. They can check energy usage by day, week, month or utility billing cycle. Sense also lets the homeowner set goals, track progress and get alerts at specific billing or usage levels. It can also learn the energy "signatures" of appliances so that it can track their usage and energy consumption in real time.

Every electrical device has a unique electronic signature—its own voice. The Sense home energy monitor listens to those voices through current sensors in a home's electric panel. With this detailed, real-time data, Sense's advanced machine-learning detection algorithms work to distinguish one appliance from another—effectively learning each individual "voice." Set alerts for when the garage door opens, the sump pump turns on, or when the dryer's done.

Sense integrates with the Phillips Hue lighting system and Amazon Alexa. The product has iOS, Android and web apps.

For more information: [www.sense.com](http://www.sense.com)



## ► Whisker Labs Ting Sensor

With fire becoming an ever-greater threat to homes everywhere, Whisker Labs has a Wi-Fi-based preventative measure. The plug-in Ting sensor device can help detect electromagnetic irregularities throughout a home's electrical network and warn homeowners of potential fire danger, and provides instructions on what to do next. The device can do its part toward reducing the resulting \$1.5 billion in property damage each year, and keep a lot of homebuilders' and architects' work intact.

The Ting sensor also continuously monitors power quality in the home. Fluctuations such as changes in voltage or line frequency can damage devices and appliances, which often leads to replacement of the appliances. Ting provides real-time visibility through an enterprise dashboard and homeowner mobile app.

The simple smart plug will work from any outlet in the home. The homeowner must also pair the plug to Wi-Fi using a mobile app. A typical installation takes only a few minutes.

For more information: [www.whiskerlabs.com](http://www.whiskerlabs.com)



# STRUCTURAL SYSTEMS, MATERIALS AND LANDSCAPING

## ▼ Viega MegaPress Stainless XL Fittings

Put away the welder—a secure pipeline now only requires the properly sized stainless steel fitting. Viega has updated its MegaPress Stainless XL line of pipe fittings, which enable builders to fix plumbing probably in a faster, more affordable way.

Designed for iron pipe size (IPS) stainless steel, the new line of MegaPress Stainless XL pipe fittings makes secure connections in seconds, which helps keep a project on time or ahead of schedule. MegaPress fittings reduce installation time by up to 90 percent compared to traditional pipe joining methods. Available fittings range from 0.5 inches to 4 inches.

Because there is no need to weld pipes together, there is major time savings: There is no fire watch or cooling process, and no unwieldy equipment to carry. And, the fittings are equipped with patented Viega's Smart Connect technology, which allows installers to easily identify unpressed connections during pressure testing.

For more information: [www.viega.us/mpstainless](http://www.viega.us/mpstainless)



## ▲ TYPAR Drainable Wrap

Housewraps are in an odd spot: They are designed to keep moisture from entering a building, but must also provide any water that does get in with a way to escape. Into this arena steps TYPAR Drainable Wrap, which sheds more bulk water, thanks to the added efficiency of an integrated drainage plane. Drainable Wrap includes a layer of multi-directional polypropylene fibers that diverts bulk water from exterior wall cavities and drains it away from the assembly, preventing the potential damage caused by mold and rot.

The rapid action feature allows Drainable Wrap to drain bulk water rapidly, per ASTM E2273 testing. The product exceeds minimum AC38 Code requirements for drainage efficiency. Drainable Wrap's adaptability also allows for it to be installed in any direction without affecting performance, which also increases efficiency.

For more information: <https://bit.ly/2FjHL36>

## ◀ TRUEGRID Eco Permeable Pavers

A 100 percent permeable, natural paving alternative to concrete and asphalt, TRUEGRID is a LEGO-like system of permeable pavers made from 100 percent post-consumer recycled plastic and filled with gravel or grass for a natural aesthetic. The Eco residential paver can be built into driveways, walkways, shed flooring, patios, pool skirts, grass pavement and more. In all cases, rainwater absorption is improved, CO<sub>2</sub> emissions from cement manufacture are eliminated, and the climate warming brought on by concrete and asphalt paving are reduced.

TRUEGRID Eco is strong enough to drive on, and Eco pavers may be quickly and simply installed. For example, for large projects, Eco arrives pre-assembled in 4-foot-by-4-foot sheets of four grids each. These 16-square-foot sections weigh only 11 pounds and may be easily handled by one person. The grids can be locked together with a mere footstep and can be reconfigured as needed. The grids can also be cut with a handheld circular saw for insertion around trees, shrubs or other irregularly shaped objects.

The product is non-toxic, harmless to plants, animals and microorganisms. It contains inert material and is groundwater neutral.

For more information: [www.truegridpaver.com](http://www.truegridpaver.com)



### ► 3B Construction Solutions *Bolt-A-Blok*

Although concrete is the most widely used construction in the world, it's not always the most efficient due to extended curing and cleanup times. Enter 3B Construction Solutions' *Bolt-A-Blok*, a unitized, post-tensioned, concrete and steel structural system that can take the place of concrete and be completed a far shorter amount of time.

*Bolt-A-Blok* is a precision-cast item, comparable in strength to poured-in-place or pre-cast concrete, that bolts together like *LEGO* bricks and does not require any mortar, water or electricity to install. As a result, a builder can set as many courses in one day as desired, regardless of weather. Each *Blok* has a compressive strength rating of 4,000 PSI, and has been fire rated, and tested and rated for hurricane-force winds and impacts.

Because of their high mass, the blocks are thermally efficient and help keep a home cool in the summer and warm in the winter. The cores in the middle of the block can be filled with anything from straw to pea gravel to spray-foam insulation to further increase the thermal capabilities of the block wall. And, all materials can be taken apart and reused for other projects—just like real *LEGOs*—lessening the need for new construction material, and reducing that construction's impact on the environment.

For more information: [www.3bstrong.com](http://www.3bstrong.com)



## STRUCTURAL SYSTEMS, MATERIALS AND LANDSCAPING

### ▲ Hunter Industries *I-80* Gear-Driven Sprinkler Motor

Hunter Industries has released a product designed specifically for the property owner with a massive amount of landscape to water. The *I-80* gear-driven motor features a wide range of highly efficient, dual trajectory, wind-fighting nozzles for highly efficient performance in a range of applications.

The *I-80* provides total top serviceability via its integrated, surface-mounted snap-ring. This no-dig solution makes maintenance quick and easy, and is ideal for professional and recreational venues alike. The *I-80* is built with a robust, dirt-tolerant gear drive that offers the highest torque output of any rotor in the commercial sphere, and extends a radius range up to 97 feet.

In addition, the *I-80* offers an advanced *ProTech Turf Cup* System, in which living or synthetic turf is retained in a cup mounted to the top of the rotor and installed flush to the surrounding turf. The special retaining rings in the turf cup add surface area for increased root adhesion, which helps keep turf securely in place.

The no-dig *ProTech TC* is also totally top serviceable and features no-tool quick-release removal of the turf cup, arc adjustments without riser removal, and a fully contained riser assembly that stays together when removed from the sprinkler's body.

For more information: <https://bit.ly/2U9KSnP>



### ◀ Quikrete *Re-Cap* Concrete Resurfacer

Designed to repair and renew old, spalled concrete with a permanent wear-resistant surface that can withstand foot, vehicle and other heavy traffic, the new Quikrete *Re-Cap Concrete Resurfacer* has a bond to concrete that is four times stronger than the concrete itself. That means a concrete substrate will fracture or crack long before its bond with the *Re-Cap Concrete Resurfacer* breaks down.

Quikrete's *Re-Cap* also has superior working time and flow characteristics than other resurfacers on the market. As a result, it's easier and faster to transform a deteriorated concrete surface into a durable, lasting

sidewalk, driveway or patio.

A proprietary blend of Portland cement, graded sand, polymer resins and other additives, Quikrete *Re-Cap Concrete Resurfacer* is a proven shrinkage-compensated tool material for making thin structural repairs to sound concrete in need of surface renewal. Applied with a squeegee, trowel or brush, one 40-pound bag will cover approximately 40 square-feet at one-eighth-inch thick and up to 80 square feet as skim coat. With a walk-on time of eight hours and drive-on time of 24 hours, it can renew a surface for about 25 cents per square foot—versus \$3.50 to \$5.50 per square foot—to remove and pour a new slab.

For more information: [www.quikrete.com](http://www.quikrete.com)

## WINDOWS AND DOORS



### ▲ INOX *Surface Mount Barn Door Lock*

Barn doors are attractive "Old World charm" style structures, but they lack privacy because of their easy opening. The INOX *Surface Mount Barn Door Lock* is a quick and easy solution to that problem. Being touted as the industry's first such product specifically for sliding barn doors, the locking mechanism features a one-inch bolt that is activated by a one-touch thumb lever or optional ADA thumb lever, and can be locked from inside of the room. It includes an emergency release key.

The dust-proof strike installs into the jamb instead of on the door, making it more discreet than typical sliding door locks. A lock only takes about 15 minutes to install from start to finish, compared to the hour typically needed for other products, making the *Surface Mount* a major benefit to a project's bottom line. It also helps architects, designers and homeowners add a product to a house that offers privacy and a beautiful design aesthetic.

For more information: [www.inoxproducts.com](http://www.inoxproducts.com)



### ▲ Madico *Solar Grey* Architectural Film

Architectural window film is known for commercial applications, but it also has its place among in the residential housing market. Madico's line of window films is an environmental gift: The film blocks 99 percent of the sun's ultraviolet rays while providing added benefits such as solar control, fade protection, improved aesthetics, and safety and security. The *Solar Grey* variety provides privacy with a neutral tone that upgrades any decor.

Madico window films are composed of thin layers of metallized and dyed, optically clear polyester laminated with special adhesives and protected by a durable, scratch-resistant coating. The film is generally installed to the inside of windows and doors, offering immediate protection from the harmful effects of the sun. *Solar Grey* is also available as an exterior application and provides a uniform outside appearance for buildings.

Architectural film is a major energy saver. Applying *Solar Grey* will reduce electric consumption by thousands of kilowatt hours and cutting cooling costs by thousands of dollars each year. Savings are increased by the product's ability to reduce glare and reject heat. The film also helps hold glass together in case of accidents or severe weather, increasing homeowner safety.

For more information: [www.madico.com](http://www.madico.com)



# HONORABLE MENTION



## Airthings Wave Plus

Airthings Wave Plus is the first wirelessly connected and battery-operated indoor air quality (IAQ) monitor, with sensors for radon, total volatile organic compounds (TVOCs), CO<sub>2</sub>, humidity, temperature and air pressure, and is designed for all indoor dwellings and workplaces. Wave Plus users also have access to interpretations of IAQ data and tips to reduce indoor air hazards, optimize ventilation and save energy. In addition, users can simply wave in front of the device to receive a color-coded visual indicator of the overall air quality. [www.airthings.com](http://www.airthings.com)

## Aura Air Air Purification System

Aura Air is a connected smart home system for managing, monitoring and actively controlling indoor air quality. Air conditioners/heating units, furniture, leaks, wood, mold and more can pollute air in homes; Aura Air filters and disinfects air through a unique five-stage purification process while vigilantly monitoring its quality in real-time, alerting users when hazards are present and if they need to evacuate. <https://get.auraair.io>

## Baldwin Hardware TouchScreen Smart Lock

Baldwin Hardware's TouchScreen smart lock offers an electronic solution to lost house keys. A user may activate the screen with their fingertips, then enter a four- to eight-digit code for easy unlocking. Additionally, the one-touch locking capability provides for quick departures requiring no key or code to lock the door. TouchScreen can be paired with three coordinating handleset grips for a signature look. [www.baldwinhardware.com](http://www.baldwinhardware.com)

## Evergreen Technologies Spectral Optical Coating

Spectral is a revolutionary optical coating technology that will allow light-sensitive devices such as solar panels and photo sensors to be disguised or seamlessly concealed in their surroundings. The durable, paper-thin coating is completely opaque but actually allows at least 80 percent of incoming light to pass through it. In addition, the coating reflects infrared radiation, helping improve the life of the solar panel. <http://facecompanies.com/spectral>



## LG Dual Inverter Smart Wi-Fi Enabled Window Air Conditioner

As the first variable-speed compressor used in room air conditioners, LG's LW1817VSM model constantly adjusts its speed to maintain desired temperature levels, resulting in less fluctuation and greater energy efficiency of 25 to 40 percent. The Wi-Fi-enabled unit can turn on or off, or adjust and monitor the room temperature remotely, via the SmartThinQ app on a smartphone, and operate the air conditioner via voice commands using Amazon Alexa and the Google Assistant. <https://bit.ly/2V4zZB5>

## Mitsubishi Electric Trane HVAC US kumo cloud Mobile App

Now integrated with Amazon Alexa, the kumo cloud mobile app and web service put enhanced control of heating and cooling at users' fingertips, no matter where they are. The integration with Alexa allows homeowners to turn their system on or off, change set points or modes for an individual zone or entire group, and request zone status, including the humidity or current temperature, simply by asking Alexa or using the app. [www.mitsubishicomfort.com/kumocloud](http://www.mitsubishicomfort.com/kumocloud)



## Weather Shield All-Wood Window

Weather Shield now offers an all-wood window, which features historically accurate details, a wide range of exterior brickmould options and monumental double-ung window sizes of up to 5 feet in width by 10 feet in height. Available in late 2019, these new windows are well suited for historical restoration projects or applications where exact architectural detail is required. [www.weathershield.com](http://www.weathershield.com)

## Whirlpool Smart All-in-One Washer and Dryer



The Whirlpool Smart All-in-One Washer and Dryer completes a load of laundry in the same machine, allowing for one load to be completely washed and dried without moving items from the washer to the dryer. Whirlpool's

newly upgraded laundry unit features smart laundry capabilities through the Whirlpool app, and—coming soon in 2019—voice control with a compatible voice-enabled device. [www.whirlpoolcorp.com](http://www.whirlpoolcorp.com)



## Wilsonart THINSCAPE Performance Tops

THINSCAPE Performance Tops are European-inspired, highly durable, ultra-thin countertops totally unique to the marketplace. Manufactured in the U.S.A., THINSCAPE is made of materials that are elegantly designed and expertly matched with the perfect finish: wire brushed, honed, sandblasted, natural and luster. Installers love THINSCAPE because they are easier to work with than porcelain options and can be installed with an undermount sink. They come with UL Greenguard Gold Certification for indoor air quality. [www.wilsonart.com](http://www.wilsonart.com)

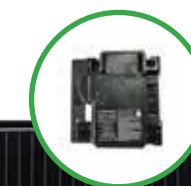


# LEAD THE CHARGE IN CONNECTED SOLAR

Today's buyers are demanding intelligent, intuitive homes.

In addition, a new California mandate requires every new home to have solar starting 2020; are you ready? See how the Eagle AC and ELAN® can enhance new homes.

Contact [us@jinkosolar.com](mailto:us@jinkosolar.com) to learn more about this new partnership.







Think twice. Build it once.



**You've got one chance to build your house right from the start.**

DuPont™ Tyvek® HomeWrap® is the original house wrap. Over 40 years ago, DuPont invented the house wrap category with the introduction of Tyvek® HomeWrap®. Today it protects millions of homes.

In fact, Tyvek® HomeWrap® is made of a unique material that helps prevent the infiltration of air and water into exterior walls, while allowing water vapor to escape and reducing the chance of mold and water damage.

As a result, Tyvek® HomeWrap® can help reduce home energy bills, improve the durability of the building and help improve your comfort. For your home, be sure to install Tyvek® HomeWrap® for superior performance.

**The difference is DuPont™ Tyvek®.** [weatherization.tyvek.com](http://weatherization.tyvek.com)



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# READERS' CHOICE 2019

## GREEN BUILDER®

### BY GREEN BUILDER STAFF

**A**LMOST 50 YEARS AGO, about the only time people thought about “being green” was when the aptly named song played on the radio. Every company seems to have an eco-friendly claim. But how much is greenwashing and how much is real progress? That’s a question we ask our professional audience to answer each year.

Unlike consumer-based reports, *Green Builder's* annual Readers' Choice survey taps into what's on the minds of green pros. What's the best smart home technology? Who offers the greenest lighting? What company has the best brand recognition? The respondents—your friends and competitors—give the answers. You, as a consumer and industry leader in your own right, provide the tools to ensure everyone indeed has no problem “being green.”

See full results of *Green Builder's* Readers' Choice survey at [www.greenbuildermedia.com/2019-readers-choice-awards](http://www.greenbuildermedia.com/2019-readers-choice-awards).

What do green professionals perceive as the most sustainable building products and brands?  
**Find out now.**

[www.greenbuildermedia.com](http://www.greenbuildermedia.com)

March/April 2019 **GREEN BUILDER** 35



# 2019 READERS' CHOICE SURVEY RESULTS

Who are the greenest brands of all? Find out in our annual survey of building professionals.

**Note:** Results as presented include only companies that received approximately 3 percent or more of total vote within a given category.

## Which company offers the best SMART HOME TECHNOLOGY platform?

Amazon Alexa	<div></div>	40.2%
Google Home	<div></div>	30.9%
Apple HomeKit	<div></div>	7.4%
Honeywell Home / Resideo	<div></div>	6.4%
Samsung SmartThings	<div></div>	5.4%
Leviton	<div></div>	3.4%
Other	<div></div>	3.4%

**Shifting fortunes.** While Amazon Alexa’s stronghold on this relatively new brand space remains strong, Google Home has closed the gap since last year. At the same time, Samsung’s SmartThings dropped from third place to fifth, as Honeywell’s complete spin off of Resideo pushed its brand forward.

Amazon Alexa 40.2%

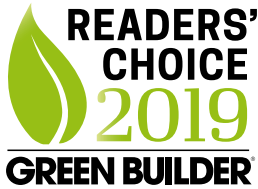
## Which company offers the best SMART THERMOSTAT products?

Nest	<div></div>	47.1%
Honeywell	<div></div>	27.5%
Ecobee	<div></div>	9.3%
Bosch	<div></div>	5.4%
Carrier	<div></div>	2.9%
Sensi	<div></div>	2.5%
Other	<div></div>	2.5%

**Nest raiders.** While Nest cleverly seized the “high ground” early in this category, Honeywell has closed the gap by seven points this year, and Ecobee, which is now backed by Amazon, crept up to the number three position. Emerson’s Sensi seems to be losing mindspace, down from 4.7% to 2.5% this year.

Nest 47.1%

See full results of Green Builder’s Readers’ Choice survey at [www.greenbuildermedia.com/2019-readers-choice-awards](http://www.greenbuildermedia.com/2019-readers-choice-awards)



## Which company offers the best SMART SWITCHES AND PLUGS?

Samsung	<div></div>	33.8%
Lutron	<div></div>	20.1%
Leviton	<div></div>	17.7%
WeMo	<div></div>	8.8%
iDevices	<div></div>	6.4%
TP-Link	<div></div>	4.9%
Other	<div></div>	4.4%

**Static field.** If you visited CES this year, you saw dozens of smart plug and switch brands. But they’ll have a hard time breaking into the top 10 of this niche. This year’s brand favorites fell in the same exact hierarchy as last year, with Samsung losing just a few points as Lutron gained.

Samsung 33.8%

## Which company offers the greenest LIGHTING products?

Philips	<div></div>	32.4%
Sylvania	<div></div>	21.1%
GE Lighting	<div></div>	18.6%
CREE	<div></div>	9.8%
Eaton Lighting (formerly Cooper Lighting)	<div></div>	3.9%
Progress Lighting (Hubbell)	<div></div>	3.4%
Kichler	<div></div>	2.5%
Halo	<div></div>	2.5%

**Brand stickiness.** Whoever thinks building professionals lack brand loyalty should compare this year’s lighting favorites with last year. It’s no coincidence that the results almost mirror the order and percentages of last year. It’s smart work on the part of brand managers that keeps them in the minds of their customers.

Philips 32.4%





## Which company offers the greenest **INSULATION** products?

Owens Corning	<div></div>	27.0%
GreenFiber	<div></div>	17.7%
Dow	<div></div>	9.8%
NuWool	<div></div>	7.4%
Rockwool	<div></div>	6.9%
BASF	<div></div>	6.4%
Applegate Insulation	<div></div>	4.9%
Insulfoam	<div></div>	4.9%
Johns Manville	<div></div>	3.9%
CertainTeed	<div></div>	3.4%



**Fiber centric.** It's no accident that Owens Corning continues to lead in this category. Its container-built exhibit at Design & Construction week was a masterpiece of multi-faceted marketing. Brand leaders and insulation "types" mostly fell in the same order as last year, although mysteriously, spray foam companies did not make the top 10 list, nor did Knauf insulation brand.

**Owens Corning 27.0%**

## Which company offers the greenest **ROOFING** products?

EcoStar	<div></div>	20.1%
Owens Corning	<div></div>	20.1%
EnviroShake	<div></div>	12.8%
GAF	<div></div>	7.8%
Boral Roofing	<div></div>	7.4%
CertainTeed	<div></div>	6.9%
DaVinci	<div></div>	4.9%
Atlas Roofing	<div></div>	4.4%

**Rising star.** EcoStar dramatically jumped to the top brand spot this year, as EnviroShake slipped to third. Owens Corning's "Roof to Roads" recycling initiative is apparently winning kudos as well. The company rose from third to second position this year. Boral Roofing's shift away from "smog eating" products apparently didn't hurt its green reputation. The company rose from 4.7% to 7.4% this year.

**EcoStar 20.1%**  
**Owens Corning 20.1%**



## Which company offers the greenest **STRUCTURAL SYSTEM** products?

Boise Cascade (EWP)	<div></div>	21.1%
Premiere Building Systems (SIPs)	<div></div>	14.7%
Logix (ICF)	<div></div>	8.8%
Weyerhaeuser-Trus Joist	<div></div>	7.8%
BuildBlock	<div></div>	7.4%
Roseberg Forest Products	<div></div>	7.4%
Fox Blocks	<div></div>	5.9%
Simpson Strong Tie	<div></div>	5.4%
Norbord (EWP)	<div></div>	4.4%
Ainsworth (EWP)	<div></div>	3.4%

**Systems thinking.** The takeaway from these results is that building pros believe almost any structural system can be green. On the top 10 list are ICFs, SIPs and several engineered wood systems, with Boise Cascade still leading the pack. SIP enthusiasts may be pleased that Premiere moved up to the number two spot, ousting Weyerhaeuser-Trus Joist.

**Boise Cascade 21.1%**

## Which company offers the greenest **SIDING** products?

BASF (EIFS)	<div></div>	16.2%
James Hardie (fiber cement)	<div></div>	16.2%
CertainTeed Cedarboards	<div></div>	10.3%
KlipTech EcoClad	<div></div>	6.9%
Dryvit	<div></div>	6.4%
Eldorado Stone (manufactured stone)	<div></div>	6.4%
Omega Stucco	<div></div>	5.4%
LP Smartside	<div></div>	5.4%
Sto (EIFS)	<div></div>	4.9%
Meridian	<div></div>	4.4%

**Dual winners.** James Hardie nudged up a few points this year to tie with the much-loved BASF stucco system for brand leadership. Another notable change: Nichiha fiber cement dropped off the top 10 chart, and both Sto and LP's Smartside product made the top brands list, perhaps because they added trim and siding products to the offering.

**BASF 16.2%**  
**James Hardie 16.2%**



Which company offers the greenest **APPLIANCE** products?

GE	<div></div>	20.6%
Bosch	<div></div>	20.6%
Samsung	<div></div>	14.7%
Whirlpool	<div></div>	14.2%
LG	<div></div>	12.3%
Viking	<div></div>	4.9%
Miele	<div></div>	4.9%
SubZero/Wolf	<div></div>	3.4%

**Shakeup.** Perhaps more than any other building product category, brand recognition and loyalty matter in the appliance category. This year, however, GE shot up several ranks to share the top spot with last year's winner, Bosch. What changed for GE? Its been aggressively promoting ENERGY STAR products, participating in appliance recycling and other initiatives. Whirlpool and LG switched positions this year, and continue to tussle just below the top brands.

GE 20.6%  
Bosch 20.6%



Which company offers the greenest **COUNTERTOP** products?

Corian	<div></div>	23.0%
Eco by Cosentino	<div></div>	13.2%
Caesarstone	<div></div>	10.8%
Formica	<div></div>	10.3%
PaperStone	<div></div>	7.8%
Samsung	<div></div>	6.9%
IceStone	<div></div>	5.4%
Cambria	<div></div>	5.4%
LG Hausys	<div></div>	4.9%
Wilsonart	<div></div>	4.9%
Zodiaq	<div></div>	2.9%

**Durability dividend.** Corian grabbed the top spot for sustainability for a second year in a row, after unseating Eco by Cosentino last year. Perhaps building pros see it as a greener alternative than granite. Other products in the top 10 maintained their relative brand status, and Zodiaq earned a spot in the list for the first time.

Corian 23.0%

Which company offers the greenest **HEATING, VENTILATION and AIR CONDITIONING** products?

Trane	<div></div>	16.2%
Carrier	<div></div>	16.2%
Bosch	<div></div>	14.7%
Lennox	<div></div>	11.8%
ClimateMaster	<div></div>	6.9%
Mitsubishi Electric	<div></div>	6.4%
LG	<div></div>	5.9%
Rheem	<div></div>	5.4%
WaterFurnace	<div></div>	4.4%
Panasonic	<div></div>	4.4%
York	<div></div>	3.9%

**R&D rewarded.** Both Trane and Carrier have done a tremendous amount of R&D to improve product performance recently, and now they happily share the top spot. Carrier, notably, moved from the number 5 spot to number 1 this year—no minor feat. Bosch remains solidly in third place, while other leading brands sustained their relative brand sentiment from last year.

Trane 16.2%  
Carrier 16.2%

Which company offers the greenest **HOT WATER SYSTEM**?

Bosch	<div></div>	34.3%
Rheem	<div></div>	30.9%
Rinnai	<div></div>	10.3%
A.O. Smith	<div></div>	5.9%
Bradford White	<div></div>	4.9%
Stiebel Eltron	<div></div>	4.9%
Takagi	<div></div>	3.4%
Noritz	<div></div>	3.4%

**Fine balance.** Bosch nudged out Rheem this year for the top spot. The two typically contend closely for the number one position. Brand recognition for this market sector remains relatively unchanged from last year, with no new players among the leading companies.

Bosch 34.3%



Which company offers the greenest **DECKING** products?

Trex	<div></div>	33.8%
TimberTech	<div></div>	13.7%
EcoLife (Viance)	<div></div>	9.8%
GeoDeck	<div></div>	7.4%
Cali Bamboo	<div></div>	7.4%
TruGrain	<div></div>	6.3%
CertainTeed EverNew	<div></div>	5.9%
Fiberon	<div></div>	5.9%



**The matter is settled.** For the third year in a row, Trex dominates this category. It's a brand position the company has worked hard to achieve and hold. The only notable shift in brand perceptions is GeoDeck, which moved up several spots—perhaps because it has promoted its use of non-wood and recycled fillers.

Trex 33.8%

Which company offers the greenest **PAINT** and **COATING** products?

Sherwin-Williams	<div></div>	24.5%
Benjamin Moore	<div></div>	19.1%
Behr	<div></div>	18.1%
Valspar	<div></div>	17.2%
Glidden	<div></div>	5.4%
Dunn-Edwards	<div></div>	3.9%
Kelly-Moore	<div></div>	3.4%
PPG	<div></div>	3.4%

**Slight shifts.** This year's paint notables follow the same pattern as last year, although Behr and Valspar switched spots. This sector, which was marked by numerous low- and no-VOC brand introductions a few years ago, now seems to have settled into comfortable familiarity for building pros. We're surprised to see PPG drifting downward in the list, however. We know the company is serious about environmental reporting on products, but somehow the messaging is being lost.

Sherwin-Williams 24.5%

Which company offers the greenest **WINDOW** and/or **DOOR** products?

Pella	<div></div>	22.1%
Andersen	<div></div>	21.1%
Marvin	<div></div>	7.8%
Jeld-Wen	<div></div>	6.9%
Therma-Tru	<div></div>	6.4%
Milgard	<div></div>	4.9%
Euroline Windows	<div></div>	4.4%
Weather Shield	<div></div>	4.4%
Masonite	<div></div>	3.4%
Sierra Pacific	<div></div>	3.4%

**Optimal views.** It must be tough to be a window maker these days. The products are so well refined that differentiating brands comes down to fine details and service, not building science. Marvin and Jeld-Wen appear to be doing something right: both moved up the list, pushing down Therma-Tru. Andersen, last year's brand leader, drops a spot behind Pella this year.

Pella 22.1%

Which company offers the greenest **PHOTOVOLTAIC SYSTEM** products?

Tesla/SolarCity	<div></div>	31.4%
SunPower	<div></div>	21.1%
LG	<div></div>	12.8%
Panasonic	<div></div>	8.3%
CertainTeed	<div></div>	5.9%
Vivint	<div></div>	4.9%
Sharp	<div></div>	4.4%
Q CELLS	<div></div>	4.4%
Jinko	<div></div>	3.4%

**Flash or future?** Despite a regular cadence of controversy about working conditions, company performance and so on—not to mention rogue comments by Elon Musk—Tesla's status as a green brand prevails. Or is it perhaps the controversy itself that puts the brand first in mental space? We expect other serious contenders such as LG, Panasonic and CertainTeed to chip away at the Tesla brand, as will brands with solid manufacturing in the U.S., such as Jinko, as PV becomes a standard in every new home.

Tesla/SolarCity 31.4%



Which company offers the greenest SOLAR SYSTEM COMPONENTS?

SolarEdge	<div></div>	30.5%
Tesla	<div></div>	17.2%
Enphase	<div></div>	8.9%
OutBack Power	<div></div>	8.4%
Sonnen	<div></div>	6.4%
Tabuchi Electric	<div></div>	5.4%
Schneider Electric	<div></div>	5.4%
Daimler Mercedes-Benz	<div></div>	4.9%
Delta Electronics	<div></div>	3.9%
Other	<div></div>	3.0%
Adara	<div></div>	2.5%

**A deeper dive.** Note how SolarEdge’s sophisticated, multi-faceted solar offerings have outpaced Tesla. Pros are looking more deeply at how PV systems actually work, comparing inverters, software and so on. Enphase boasts similar credentials: A smart company that solved the problem of battery-powered smart gadgets, for example. In this category, the smartest, most reliable, hands-off brands win.

SolarEdge 30.5%



Which company offers the greenest PLUMBING FIXTURE products?

Kohler	<div></div>	31.9%
Moen	<div></div>	15.2%
Delta	<div></div>	12.3%
American Standard	<div></div>	9.8%
TOTO	<div></div>	9.3%
Niagara	<div></div>	5.4%
Grohe	<div></div>	3.9%
Hansgrohe	<div></div>	3.9%
Gerber	<div></div>	3.4%
Pfister	<div></div>	2.9%

**Innovators rising.** Kohler’s brand clout still dominates this category, although it has made a few wrong turns this year, in our view, with its Alexa-enabled products. Moen, in contrast, has mostly avoided more gimmicky upgrades to introduce new technology that saves water, as have TOTO and Niagara. Overall, the trend is a good one. Brands making strides toward more efficiency continue to be held in highest regard by high-performance building pros.

Kohler 31.9%

Which company offers the greenest SOLAR THERMAL products?

SunEarth	<div></div>	27.0%
Rheem	<div></div>	24.5%
SunMaxx Solar	<div></div>	18.1%
Solar US	<div></div>	10.3%
Steibel Eltron	<div></div>	6.4%
AET Solar	<div></div>	6.4%
Other	<div></div>	3.9%
Apricus	<div></div>	3.4%

**Rising suns.** Another year, another leader atop the Solar Thermal list. SunEarth moves up two spots to unseat Rheem as the maker of greenest solar thermal products, while SunMaxx Solar moves ahead of last year’s runner-up, Solar US.

SunEarth 27.0%

Which company offers the greenest BUILDING WRAP products?

DuPont Tyvek HomeWrap	<div></div>	38.2%
Tremco Enviro-Dri	<div></div>	9.8%
Fortifiber WeatherSmart	<div></div>	8.3%
Huber Zip System	<div></div>	5.4%
Typar HouseWrap	<div></div>	5.4%
Dow Weathermate	<div></div>	5.4%
Owens Corning PinkWrap	<div></div>	5.4%
Kimberly Clark Block It	<div></div>	4.9%
Keene Driwall	<div></div>	3.9%
CertainTeed	<div></div>	3.9%
GP Forcefield	<div></div>	2.9%

**Impenetrable.** Tyvek’s brand lead keeps growing. Seriously, its marketing team deserves a raise. The company is up 8 points since last year. One interesting shift from 2018: Huber Zip System, at 10%, seemed to be closing the HomeWrap gap, but fell back to fourth position, and Tremco’s Enviro-Dri, a spray-on product, shot to number two. Perhaps code changes that affect air infiltration have spurred awareness of Enviro-Dri’s specifications.

DuPont Tyvek HomeWrap 38.2%



Which company offers the greenest **CABINET** and **SHELVING** products?

IKEA	<div></div>	27.0%
KraftMaid	<div></div>	13.2%
Timberlake	<div></div>	11.3%
Advanta Cabinets	<div></div>	9.8%
Merillat	<div></div>	8.3%
Echelon Cabinetry	<div></div>	6.4%
Wood-Mode	<div></div>	5.4%
MasterBrand	<div></div>	5.4%
Neil Kelly	<div></div>	4.4%
Merillat	<div></div>	3.9%
Executive Cabinets	<div></div>	3.4%

**Default leadership.** Once again, IKEA grabbed the top brand position in the cabinet category, but that's not as notable a feat as it sounds. Cabinet brands in the U.S. typically lack a substantial green narrative. They rely on the fairly weak Kitchen Cabinet Manufacturers Association certification to prove their green credentials. It's time for a U.S. brand to pull away from the pack and offer cabinet options that are free of offgassing and are made sustainably, with genuine environmental commitment and process.

IKEA 27.0%

Which company offers the greenest **FLOORING** products?

Armstrong	<div></div>	27.5%
Cali Bamboo	<div></div>	18.1%
Mohawk	<div></div>	15.2%
Shaw	<div></div>	7.4%
Interface	<div></div>	5.4%
Milliken	<div></div>	5.4%
Tiles of Italy	<div></div>	4.9%
Crossville Tile	<div></div>	4.4%
Forbo	<div></div>	4.4%
Mullican	<div></div>	3.9%
Lauzon	<div></div>	2.9%

**Slow motion.** Like cabinetry in the U.S., most flooring is not especially sustainable. The top four brands, in similar position to last year, have each made efforts to improve durability, switching to more-sustainable materials, and so on. The challenge is that durability is the primary attribute of a floor. It takes a beating and has to last. Tile is always a strong option, but not always the buyer's first choice. For now, the best way forward is probably to increase the ease and availability of recycling of carpet and engineered flooring products.

Armstrong 27.5%

Which company offers the greenest **VENTILATION SYSTEMS**?

Panasonic	<div></div>	27.9%
Delta Breez	<div></div>	18.1%
Air King	<div></div>	16.7%
Broan NuTone	<div></div>	15.7%
Fantech / Systemair	<div></div>	11.3%
Aprilaire	<div></div>	4.4%
S&P	<div></div>	2.9%

**First class.** The right company again took home the gold in this category this year. We visited Panasonic at the Design & Construction show, and it demonstrated its new *Cosmos* ventilation product line. It's a game changer. Air King this year edged out Broan, perhaps because Air King's centrifugal fan range hood technology is extremely quiet. Research shows that noise reduction is essential in range hoods. Otherwise, consumers simply won't use them.

Panasonic 27.9%

Which company offers the greenest **WORK VEHICLES**?

Toyota	<div></div>	31.9%
Ford	<div></div>	25.0%
Chevy	<div></div>	11.8%
Nissan	<div></div>	10.8%
Mercedes-Benz	<div></div>	8.3%
Dodge RAM	<div></div>	3.4%
Sprinter	<div></div>	3.4%



**Evolving tech.** Toyota's lead in this mindscape grew by about 5% this year—but Ford and Chevy held on to their strong brand sentiment. All of these top brands have strong reputations for efficiency. The shift to high-torque electric drives, fuel cells and powerful hybrid engines will continue to shake up the industry, which has seldom seen such rapid change.

Toyota 31.9%



Pick the one brand that you associate most strongly with **SUSTAINABLE PRODUCTS** and **ENVIRONMENTAL STEWARDSHIP**.

Tesla	<div></div>	17.3%
Bosch	<div></div>	14.4%
Sunpower	<div></div>	7.4%
GE	<div></div>	6.4%
Amazon	<div></div>	5.9%
LG	<div></div>	5.5%
Siemens	<div></div>	5.5%
Owens Corning	<div></div>	5.0%
Whirlpool	<div></div>	3.5%
Google	<div></div>	3.0%
Kohler	<div></div>	3.0%
Armstrong	<div></div>	3.0%

**An almost level field.** Tesla’s brand clout is undeniable. But Bosch is a powerful contender, with its global reach and vast portfolio of building products, self-driving vehicles and even electric bicycles. Building pros tend to have strong brand loyalties, as the neck-and-neck inclusion of so many other brands illustrates. There’s no reason tomorrow’s “top” brand couldn’t be any one of these other companies.

Tesla 17.3%

Which categories are most influenced by **GREEN BUILDING** and **SUSTAINABILITY CONSIDERATIONS**?

Insulation	<div></div>	42.86%
Windows	<div></div>	36.31%
HVAC	<div></div>	32.14%
Appliances	<div></div>	29.76%
Lighting	<div></div>	26.19%
Roofing	<div></div>	22.62%
Structure	<div></div>	22.02%
Paints and Adhesives	<div></div>	19.64%
Hot Water systems	<div></div>	16.07%
Flooring	<div></div>	13.69%
Siding	<div></div>	11.90%
Home Automation	<div></div>	8.33%
Plumbing Fixtures	<div></div>	8.33%
Faucets	<div></div>	4.17%

**Upside-down pyramid.** This chart should come as no surprise if you’re familiar with the *Green Builder Pyramid*. In it, we demonstrate how a well-designed green home starts with the essentials, through insulation, windows and appliances, before “topping” the project with renewables.

Insulation 42.9%

Rate how easy it is to **ACCESS SUSTAINABLE PRODUCTS** in each product category.

- Most Green Options
- Some Green Options
- Fewest Green Options



Roofing	<div></div>	16.92% 67.69% 15.38%
Structure	<div></div>	17.95% 65.64% 16.41%
Siding	<div></div>	18.46% 64.62% 16.92%
Insulation	<div></div>	37.95% 47.18% 14.87%
HVAC	<div></div>	34.36% 51.28% 14.36%
Windows	<div></div>	45.13% 40.51% 14.36%
Appliances	<div></div>	42.05% 43.08% 14.87%
Faucets	<div></div>	30.26% 54.36% 15.38%
Fixtures	<div></div>	24.10% 58.97% 16.92%
Countertops	<div></div>	27.18% 50.26% 22.56%
Cabinets	<div></div>	24.62% 51.28% 24.10%
Paints and Adhesives	<div></div>	29.23% 45.13% 25.64%
Lighting	<div></div>	48.72% 38.97% 12.31%
Home Automation	<div></div>	31.79% 47.18% 21.03%





**Not so distant.** In the future, and even now, housing must be flexible, efficient and resilient.

COURTESY OF KASITA

# The Align Project: Align Your Future

It's time to rethink where we live, what we buy and how we can help ourselves go with green.

BY JULIET GRABLE

**O**N THE ONE HAND: climate change disasters, species extinction, geopolitical upheavals and population growth. On the other: renewable energy, zero-carbon transportation, protein substitutes and smart tech.

When thinking about the future, it's easy to vacillate between hope and despair. Throughout The Align Project, we've been reexamining how we live. Now it's time to look ahead and question our assumptions about the future.

If you're involved with green building, you already understand that we need to radically revamp our buildings. You may also believe we need to rethink what we purchase, what we eat, how we get from A to B, how we age and even how we die. It's a revolution that, in many ways, has already begun.

## THE MATERIAL REVOLUTION

Let's start with something familiar: our homes. Buildings consume resources during construction and occupancy. The relationship between a material's environmental impact and its contribution to energy efficiency and comfort often sets up a conflict; for example, the manufacture of closed-cell spray foam insulation produces greenhouse gas emissions, yet spray foam helps a building save energy over its lifetime.

Building professionals have a real opportunity to effect change by showing a preference for materials with good sustainability pedigrees, and rewarding companies that have embraced transparency and



CREDIT: MUNIRAH CHUSANT/WIKIMEDIA

**Cleaning up our mess.** Not only will bioplastics take the place of petroleum, plastic garbage will be harvested and turned into useful products.

responsible manufacturing. Product certifications and transparency labels such as the Forest Stewardship Council (FSC), Cradle-to-Cradle, and Declare, along with transparency documents [Health Product Declarations (HPDs) and Environmental Product Declarations (EPDs)] can help specifiers and citizens alike make responsible choices. Though homeowners are less likely to read an HPD, they'll more often choose products with labels like Declare, GREENGUARD or SCS Indoor Advantage, which identify them as free of toxins.

The hope is that in the future, we won't need those labels, because all products and materials will be non-toxic and biorenewable. In the meantime, anyone can demand change. If enough people climb aboard, it works. Trader Joe's is a recent case in point: Responding to a consumer petition [<https://bit.ly/2W4GST9>], the grocery franchise finally announced it would phase out wasteful plastic packaging, including plastic produce bags and those annoying plastic containers used to encase apples and tomatoes.

Another case in point: Spray foam manufacturers are embracing next-generation blowing agents with lower global warming potential. It takes time, but this is an area where consumers—who are actually citizens with purchasing power—can make a difference.



## THE HEALTHY HOME

Climate change has dire implications for human health. According to the Centers for Disease Control and Prevention (CDC), climate change will increase air pollution, vector-borne diseases and allergens, and negatively impact water quality and interrupt food production.

Extreme weather and temperatures will expose people to potentially life-threatening conditions, and warmer temperatures will worsen air quality and promote the growth of disease-carrying pathogens. Temperature fluctuations can also increase the incidence of certain diseases such as pneumonia, especially in children, the elderly or immune-compromised people.

We already spend most of our time inside. Healthy indoor air will



**Walking the plank.** An ultra-green product, Trex decking is made with everything from plastic bags to newspaper sleeves.

CREDIT: COURTESY OF TREX

## On Deck

BACK IN THE mid-1990s, Trex pioneered composite decking—a magical material composed of wood and plastic that imitated the look of wood but without the hassle. More than 20 years later, Trex is still on top, and the company offers a variety of companion products, including railings, pergolas, spiral staircases and landscape lighting. Options such as steel framing and hidden fasteners enhance strength and aesthetics.

In 2009, Trex introduced *Transcend*, the first encapsulated composite decking on the market. The composite core is wrapped on three sides with a proprietary high-performance material, enhancing its fade, stain, scratch and mold resistance. And while all of the company's decking and railing products offer a 25-year limited residential warranty against material defects, the *Transcend* line includes an additional 25-year limited residential fade and stain warranty.

The company gets high marks on sustainability, too. Trex products are made with 95 percent recycled content: The wood component is reclaimed sawdust; the plastic is sourced from sources ranging from grocery bags to newspaper sleeves.

## Materials of the Future

Some of these materials are in development, while others are already available:

**Translucent solar panels** will turn any window or glass surface into an energy generator, by harvesting wavelengths invisible to the human eye.

**Adaptive glass** will automatically tint in response to sunlight and temperature, reducing radiant heat gain and glare.

**Mycelium-based products** will utilize the underground portion of mushrooms and other fungi to make biodegradable packaging, footwear and a composite material used in furniture, door cores, insulation and more.

**Ocean plastic** will be recovered and upcycled into products ranging from sunglasses and running shoes to yarn to carpet tiles. See <https://s.si.edu/2CjuDdH>.

**Thermoelectric coatings** will generate electricity from waste heat and be applied to almost any surface, including vehicles, buildings and even wearables. See <https://bit.ly/2XTioxT>.

**Hemp fibers** will be used to make a variety of strong, lightweight building materials, including wallboard, sheathing and cabinet carcasses. (Hemp chips are already mixed with a lime-based binder to make hempcrete, a lightweight insulating material.)

**Biorenewable plastic**, produced by bacteria, algae and other microorganisms, will be used in various products which can then be recycled and reused.

**Self-healing concrete**, a new and improved version of the ubiquitous building material, will come with bacteria or fungus spores which become active in the presence of water. When activated, they produce calcite, which fills cracks.

become even more imperative when outdoor air is compromised. For example, wildfire smoke contains particulate matter, which can compromise lung function and aggravate conditions like asthma; it's even linked to some cancers. Millions have suffered prolonged exposure to wildfire smoke over the past several years. The Fourth Climate Assessment, released in November 2018, predicts [<https://bit.ly/zzTMPTk>] that wildfires will increase by 30 percent by 2060, exposing more people to wildfire smoke for longer periods of time.

For this reason alone, smart indoor air quality (IAQ) devices may become as ubiquitous as smoke detectors in some regions. The Align Project includes an Awair 2nd edition unit, which tracks five components of indoor air: temperature, humidity, CO<sub>2</sub>, particulate matter and volatile organic compounds (VOCs). The new edition can detect fine dust or particulate matter down to 2.5 microns. The Awair app will send the user a notification if IAQ dips below a certain threshold.

The strategies already embraced by green homebuilders—ensuring an adequate supply of fresh air, choosing non-toxic finishes, and even spec'ing materials that actively and passively purify indoor air—will become standard.

Ductless mini-splits, such as the Rheem unit featured in The Align Project, will be ubiquitous (as they already are in Europe), recognized not only for their energy efficiency, but for their ability to filter incoming air.

But tomorrow's homes may be healthy in a different way. Yes, they will be efficient and high-tech. But they will also be more integrated



**The great smoke-out.** In 2018, smoke from wildfires in the Western states drifted as far as the East Coast.

with nature, and instead of being consuming end-users, occupants will be part of an ecosystem, using their homes to produce energy, recharge aquifers and grow food.

## GOING FLEXITARIAN

In more ways than one, our diets are a disaster. Across the globe, prime habitat has been converted to farmland, and huge volumes of chemical fertilizers, pesticides and animal waste run off into waterways. The oceans are being plundered. And yet, nearly 30 percent of food is wasted in the U.S., where many people are simultaneously obese and malnourished.

We have a template for a more sustainable diet. Faced with the dilemma of feeding a global population that is predicted to reach 9.8 billion by 2050, a group of 30 scientists from around the world published a report [<https://bit.ly/2FaP9PG>] that includes a tidy summary of the “Diet of the Future:” plant-centric, with small amounts of meat, dairy and sugar. This “Flexitarian” diet is something we can aspire to now, and is sure to be a win-win for the planet and our own health.

The vast majority of greenhouse gas emissions (78 percent) related to food production are tied to animal protein. Animals are not very efficient at processing food. Fish are much more so, as are insects.

The Food and Agriculture Organization (FAO) of the United Nations is already on it. In 2013, the organization issued a report [<https://bit.ly/2HkQ6Hd>] explaining how insect-based protein can contribute to food security. Crickets, for example, require just two kilograms of feed for every one kilogram of bodyweight gain. Insects can also feed on “side-streams” such as human and animal waste, and they require very little water.

Perhaps less controversial, aquaculture is growing exponentially, and the FAO predicts fish farming will soon eclipse fishing. But perhaps closed-loop systems such as aquaponics offer the greatest hope. Aquaculture, in which fish waste feeds veggies and runoff from veggies feeds fish, does not require soil and is water and space efficient. Aquaponic greenhouses can even be integrated into housing or multi-use buildings, providing a sustainable food source, along with local jobs and greenery. Sounds utopian, but several such

developments are in the works.

I don't believe we're facing a future of deprivation. Humans are incredibly creative and resourceful—and don't knock insect-based protein, algae or 3D-printed hamburgers until you've tried them.

## WATER SECURITY

We like to celebrate homes that conserve water, and technologies that recognize the true value of our most precious resource. But there are pragmatic reasons to emphasize water efficiency. Our water infrastructure is aging, and with age comes risk. As the Flint, Mich., polluted water crisis showed so tragically, we can no longer take safe, abundant potable water for granted.

Droughts and climate change are already threatening water security. Disasters such as hurricanes and wildfires can interrupt and compromise water supplies, which happened after the Camp Fire in Paradise, Calif., where water pipes were contaminated with heavy metals and toxic chemicals [<https://bit.ly/2H57W0t>] such as benzene.

Droughts can also spark rationing. Increasingly, municipalities are turning to reuse, even potable reuse, where effluent from wastewater treatment plants is treated to potable standards. Admittedly, this strategy will take some careful PR to win people over, but in the future, people won't even raise an eyebrow at the notion. Here are a few more trends we expect to see:

**Reuse, reuse, reuse!** Some municipalities in drought-prone regions are already requiring homes to be “dual-plumbed” for future reuse. In the future, graywater reuse will be standard, and toilets will never be flushed with potable water.

**Vacuum-flush and composting toilets.** Once confined to cruise ships, vacuum-flush toilets will use a fraction of the water of today's most efficient models. Most buildings will also have composting units for human waste.

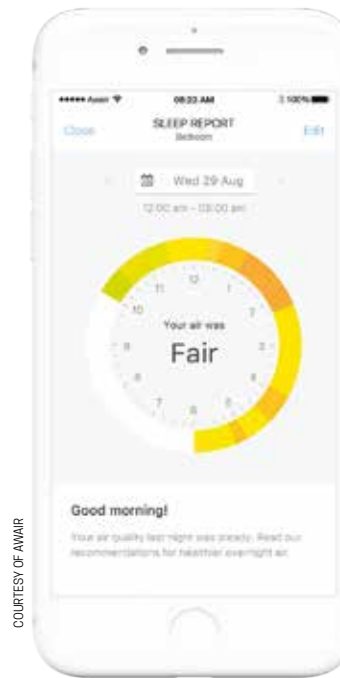
**Distributed water.** Small individual water tanks and/or neighborhood cisterns, some supplied with treated rainwater, will ensure at least a limited supply of potable water.

**Smart water meters.** Soon to be as common as smart energy meters, these will detect leaks, identify unusually high usage and provide customers with feedback.

**The end of the lawn.** All irrigation will be connected and efficient, and food gardens (including greenhouses) will replace lawns. Except in the rarest cases, potable water will never be used to water landscaping.

## THE ALIGN PROJECT WATER STRATEGIES

Of course, water-efficient fixtures are important. But The Align Project goes a step further by including strategies that not only save water and energy, but ensure water quality and protect the home. One of these is *Flo*, a smart leak detection device that is installed on the main water supply line. By running daily tests, *Flo* can detect small leaks that, drop by drop, add up to thousands of gallons of wasted



**Safe zone.** The Awair app lets you choose from settings tailored for different activities or occupants.

COURTESY OF AWAIR



**Flo Technologies**  
 smart leak  
 detection  
 system



**Haier 24-inch front  
 load washer/dryer  
 combo**



**Viega**  
 residential  
 fire sprinkler  
 system



**Viega MiniBloc**  
 manifold and PureFlow  
 plumbing system

## The Align Project Water Strategies

Many homes have water-efficient fixtures. The Align Project goes a step further with devices that help ensure water quality and protect the home. Here are several major products found inside.



**Rheem Professional**  
 Prestige hybrid  
 heat pump  
 water heater



**Voltea DiEntry and  
 DiUse residential  
 water purification  
 systems with  
 membrane-  
 capacitive  
 deionization  
 (CapDI) technology**



**Viega Eco-Plus WC carrier  
 and Duravit toilet**



**Manifold master.** Viega offers  
 one-stop shopping, including  
 specialized tools for its fittings.

CREDIT: COURTESY OF VIEGA

water. According to the U.S. Environmental Protection Agency (EPA), the average home could save 10,000 gallons per year simply by addressing leaks.

Flo measures flow, water pressure and temperature, and will send a real-time alert to the homeowner's phone if a leak is detected. It will also automatically shuts off water in the event of catastrophic failure.

The Align Project also features the Viega *MiniBloc*, a smaller version of the company's *ManaBloc* central plumbing manifold. These manifolds, which can be compared to an electric panel, enable a "home run" plumbing design, where each fixture has its own dedicated line and shutoff. This is an advantage for maintenance, as single lines can be shut off without disrupting water supply elsewhere.

The manifolds also save water and energy. They are plumbed with Viega's *PureFlow* system, which includes the company's cross-linked polyethylene PEX tubing and press-and-crimp fittings. Different fixtures can be fed with differently sized lines; in fact,

most can be fed with 3/8-inch or half-inch line, compared with larger 3/4-inch supply lines typical of branch-and-tee systems. The combination of dedicated lines and smaller volumes means that far less water is wasted purging lines of cold water—according to the company, up to 40 percent less.

Finally, The Align Project features *DiEntry* and *DiUse* residential water treatment units from Voltea. The units rely on a technology called membrane-capacitive deionization, or *CapDI*, which is a two-step process that removes salts from water.

During the purification step, water passes between two oppositely charged electrodes. The salt ions are attracted to the electrodes, while the water passes through. Once the electrodes are saturated with ions, the polarity of the electrodes is reversed and the ions are released and flushed from the unit. The process recovers up to 95 percent of the water treated. The percentage of salts removed from the water is also "tunable,"

**H<sub>2</sub>O here.** *DiEntry*, Voltea's residential point-of-use water treatment system, is low maintenance, efficient and requires no salts or chemicals.

meaning users can decide how much salt they want removed.

*CapDI* can work at high temperatures, unlike reverse osmosis, and it does not require chemicals or added salts. The technology is applicable to water reuse. For example, used laundry water can be recovered and treated with *CapDI*, then used to flush toilets. *CapDI* can also be used to remove salts from water destined for cooling towers.

## AGING IN PLACE: AGING WITH GRACE

By 2035, one-third of U.S. households will be headed by someone age 65 or older, and many of these seniors will be living alone. Many will face decreasing incomes, which will make it more difficult to pay the mortgage and upgrade the home for aging in place. How will people stay connected, independent and safe?

Baby boomers are showing us some of the answers. Their tendency to question the status quo has not abated with age, and they have the financial resources to back up their demands.

Many are rejecting "the home" in favor of *their* homes. According to AARP, nearly 90 percent of seniors want to stay in their own homes as they age. (Ironically, this trend may be adding [<https://bit.ly/2UArpd9>] to the housing crunch.) Some have taken matters into their own hands and created their own net-zero, cohousing-style communities such as Ankeny Row [<https://ankenyrow.wordpress.com>] in Portland, Ore. Others are living in apartment-style housing with plenty of amenities and easy access to restaurants, shops and classes. And some have downsized into "granny flats" behind their grown children's homes.

But there's a huge disparity between those who can afford to choose and those who can't. What option do you have if you can't afford to design and build your own development? The Align Project offers one possibility: small, hyper-efficient units that can physically move and change with you. The home's Orient smart home platform, with the integrated Loxone lighting system, is key. The occupant can be involved in programming the home or letting it run on autopilot. The system is ready to go as soon as you open the door and ask the lights to turn on.

Though low-tech and practical solutions such as ramps, grab bars and handrails are essential for aging in place, voice-activated technologies, programmable devices and "virtual doctors" are enabling older people and those with disabilities to remain independent. Other examples include sensors that detect a person's location and movement, and dispensers that dole out the correct dose of medication at the right time. And don't discount the importance of apps, such as Skype and FaceTime, which can help people stay connected with loved ones— isolation and loneliness are as deadly as cardiovascular disease.

So what will the future hold, not only for those nearing the end of their lives, but for those just starting out? We'll likely see an intensification of the trends we're already seeing now: smaller, more flexible homes, more sharing of resources and more intergenerational households. Resilient homes that can shelter occupants from disasters and serve their needs efficiently. Will any of it be enough? That will be up to us. **GB**



CREDIT: DEAN MITCHELL/ISTOCK

**Health aids.** Smart watches with apps that monitor vital signs and detect falls are among the technologies helping more people remain independent.



# The HERS Variability Study: What Does It Mean for the Industry?

Only time will tell if the industry is headed for a better code compliance method.

BY MIKE COLLIGNON

**B**Y NOW, YOU MIGHT HAVE HEARD about the *Home Energy Rating Variability Study*, which was prepared for the Department of Energy (DOE) and conducted by the six regional energy efficiency organizations (REEOs). It was first summarized at the February 2018 RESNET Board meeting, but the complete report was finally released in January 2019. The following is a summary and commentary on the study, as well as its potential ramifications on the building industry.

Let's start with the premise of the study. Quoting directly from report: "The U.S. Department of Energy (DOE) Building Energy Codes Program...commissioned a study in an attempt to better understand how home energy ratings might function as a code compliance mechanism, and to address the question of variability that could be expected if enlisting the HERS Index for the purpose of demonstrating code compliance via the ERI path." Finally, DOE stressed "that the study sought data on the consistency of multiple ratings on a single home and not whether the resulting ratings complied with the code (via the ERI targets specified in the IECC)."

Both by its name and the initial premise, there was an expectation that variability would be found. That in and of itself shouldn't surprise anyone, since the object of the study was subjective analyses of homes. It could be posited that variability was inevitable. The key was to determine the level of consistency among HERS raters.

Next, the methodology used was to dispatch between four and six HERS raters to a chosen home. The RESNET-certified raters were not made aware they were evaluating the same home, nor did their onsite presence overlap with each other. Each rater was given documentation in advance. From that, they were able to conduct a plan review, but they followed that up with a field inspection/onsite verification based on RESNET protocol. The output of each analysis was a preliminary HERS Index and a Building Summary Report. Two homes per region were selected, though in the end, only 11 homes were rated. This methodology produced 56 home energy ratings in total.

The broad range of ratings for a singular home produced through this study was more than many expected. The study noted: "A

majority of homes (7 of the 11) experienced variability of 10 or more points. Average variability across all homes studied was approximately 13 points." The table below breaks down the ranges for each location:

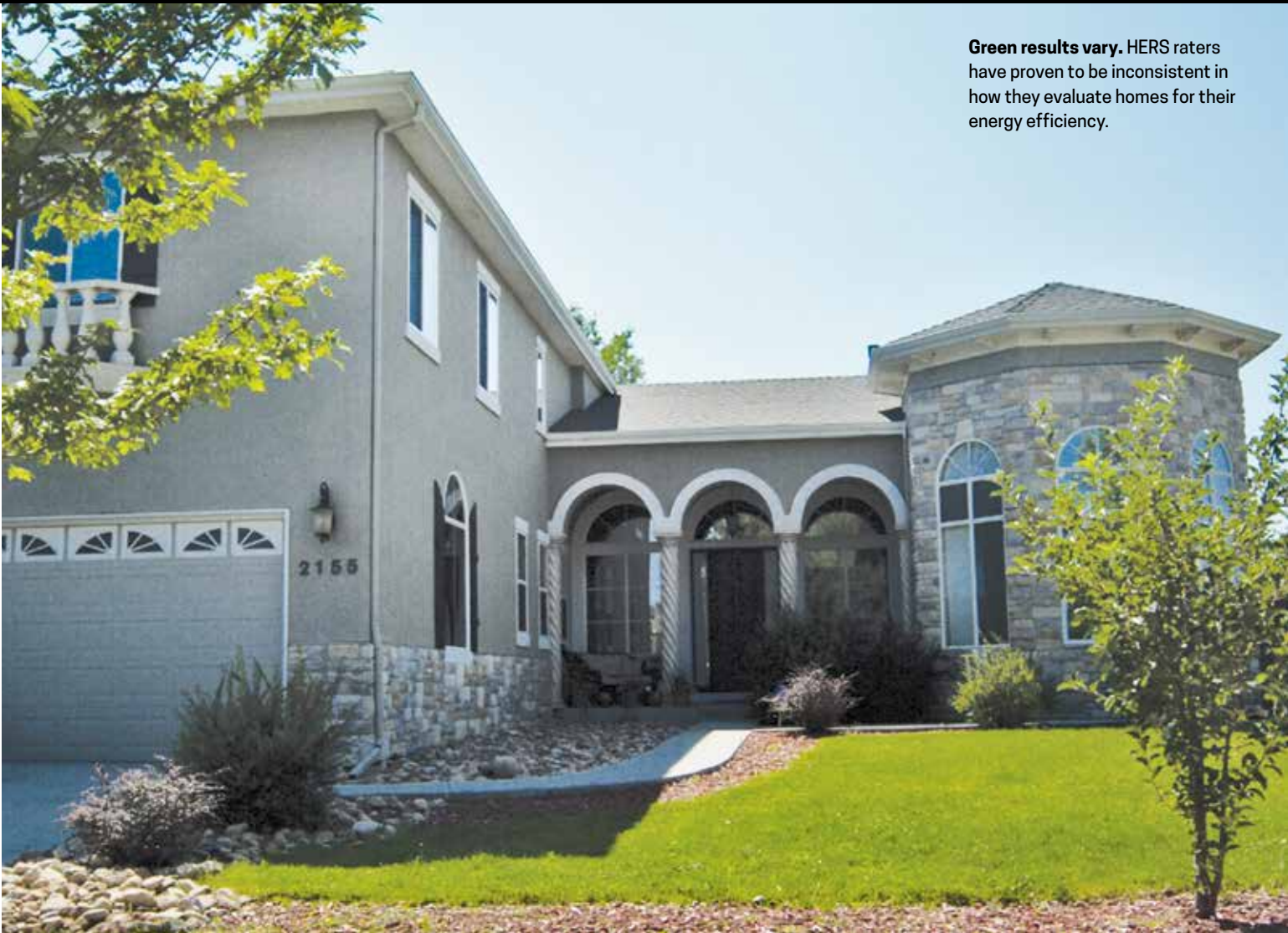
Location	HERS Index	
	Lowest	Highest
Austin, TX	65	79
Chicago, IL	40	51
Dallas-Fort Worth, TX	64	79
Denver, CO	67	99*
Derby, CT (w/o PV)	43	55
Derby, CT (w/PV)	19	30
Grand Rapids, MI	58	65
Orlando, FL	59	74
Portland, OR	82	88
Salt Lake City, UT	42	51
Seattle, WA	71	79
Tallahassee, FL	62	74

\*99 is the clear and obvious outlier of the five results for this home. Yet even if that data point is excluded, the next highest index is a 79, which represents a 12-point range.

## A DEEPER DIVE

Digging deeper into the study's findings, the inconsistencies were widespread. For example, five raters performed an analysis of the Seattle home. Three of the five raters counted five bedrooms, while the other two raters only counted four bedrooms. Keep in mind that each rater was given house plans, window schedules, insulation values and other default or non-observable information *prior* to their onsite assessment. Even more amazingly, the calculated shell area ranged from 6,096 square feet to 7,107 s.f. No two raters calculated the same shell area square footage for this home—and this home's range of indices was one of the smaller ranges in the entire study!

For the three-bedroom house in Denver, three of the five raters counted five bedrooms, while one rater counted four bedrooms and the other rater counted the correct number. Only three of the five



Green results vary. HERS raters have proven to be inconsistent in how they evaluate homes for their energy efficiency.

raters conducted a total duct leakage test, and only two of the five raters tested for duct leakage to the outside. Astonishingly, the total area of wall square footage reported by the raters ranged from 2,187 s.f. to 4,250 s.f. Window area ranged from 242 s.f. to 451 s.f. The number of returns ranged from five to nine. When it came to ceiling fan energy usage, three of the five raters didn't mark anything down, and one rater entered zero for the refrigerator's energy usage.

The study noted that a wide range of software was used, with the average home rated using three different versions of software and, in one instance, a particular home was rated with five different versions of REM/Rate software among six raters. While it's uncertain if software had a significant contribution to the range of variability, the inconsistencies noted above are independent of software. The discrepancies can be attributed to either poor training or a failure to execute the requisite training.

This study was incredibly important, because multiple jurisdictions (states and cities) have incorporated alternative code compliance paths built around energy ratings. As the study stated, "consistency and replicability of the rating process is crucial to the ERI path." It went on to say "while the HERS Index was not originally specified within the ERI path of the 2015 IECC, the connection was made more explicit when ANSI/RESNET/ICC Standard 301 was incorporated by reference in the 2018 IECC."

## MANY QUESTIONS, FEW ANSWERS

The study states that "it is based on a relatively small sample of homes, and should not be considered statistically representative." Yet the very next sentence notes that "it...raises many important questions for further inquiry." The authors call out five questions for further investigation, but the most significant questions can only be answered in retrospect. The first is: What reaction did this study elicit?

To its credit, RESNET reacted fairly quickly. On April 19, 2018 (approximately two months after the study's results were conveyed), RESNET adopted the HERS Software Consistency Collaborative Modeling Process [<https://bit.ly/2VPrJEW>]. One facet of this new effort was to recruit a "technical consultant with extensive knowledge of building energy software modeling" to serve as the RESNET Energy Modeling Director.

Unfortunately, that recruitment process took almost six months to produce a new staff member [<https://bit.ly/2NVAFWB>]. Over the course of 2018, RESNET made the following revisions to the quality assurance aspects of the National Home Energy Rating Standards after the variability study was released:

- Added a compliance path to achieve Quality Assurance Designee (QAD) status, whereby the minimum number of reviews increased



- from 25 to 30, though the type of reviews changed to allow file reviews (approved Aug. 9, 2018). [https://bit.ly/2VMT9ex]
- Modified software accreditation to generate more consistency, and allowed for appeals to the RESNET Standing Software Consistency Committee (approved Oct. 12, 2018). [https://bit.ly/2HqMeDU]
  - Revised its original policy on the financial separation of Quality Assurance Designees (approved Nov. 15, 2018). [https://bit.ly/2UwxzL1]
  - Provided default ventilation fans for improved consistency while citing ASHRAE 62.2-2013 (approved Nov. 29, 2018). [https://bit.ly/2CaoiBi]

Another enormous question is: Will there be any damage done to the energy ratings industry, or the concept of energy ratings in general? There are many people and entities, not the least of whom are the 1,900 HERS raters across the country, who hope not. However, there are some changes taking place. Some jurisdictions are moving away from citing HERS in their respective energy codes, and are instead adopting the ERI path in the IECC or ANSI/RESNET/ICC 301. While the difference is subtle, there is significance in the fact that RESNET is not required to obtain a code-compliant ERI (RESNET is attempting to change that, but that's a story for another day). A jurisdiction's decision to transition from HERS to ERI could be driven by the desire to cite an ANSI standard, and might not have anything to do with the results of the variability study. Or, the results of the study might simply serve as a reinforcement of such a decision. Without asking each jurisdiction, it's hard to say what their motivation is.

PREVENTATIVE MEASURE

The unfortunate part of this whole saga is that this could have been avoided. At the 2013 RESNET Conference in Orlando, keynote speaker (and Green Builder® Media President) Ron Jones shared this sage advice to a crowded room [https://bit.ly/2VJHYDo]:

“If you don’t keep your integrity as an organization and as an individual practitioner, you don’t amount to anything. You have to keep that integrity or we’re all sunk.”

He went on to say:

“We are only going to be as effective as the person in this room, the person in this industry who cares the very least.”

By its own admission in the previously cited April 18, 2018, press release, RESNET had been striving “for the past four years...to enhance the consistency of the calculation of HERS Index Scores.” That means it took the group a year to react to its own keynote speaker’s warning. Setting that delay aside, it appears the release of the variability study is what really sparked significant action. That is supported by a HERS provider (who wished to remain anonymous) that felt the result of the variability study “wasn’t a surprise.” If this issue was known to exist, why wait to fix it?

The months and years ahead will tell us whether the issues highlighted in this study are a dent that can be buffed out or a devastating gash in the hull. The good news is that the instruments of repair already exist. In addition to the steps RESNET has already



**His and HERS.** The Department of Energy’s recent study on building energy code compliance is an effort to better understand how home energy ratings might function as a code compliance mechanism.

taken, other potential areas of improvement include: increased quality assurance and quality control; consistent software standards; more-consistent training; reduced tolerance for errors; and increased enforcement including, if needed, suspensions or revocations of an individual’s accreditation. That leaves us with the final question: Will the industry fully commit to making the necessary improvements? If not, then anything short of that might simply amount to rearranging deck chairs. **GB**

Resources:

1. Department of Energy – *Home Energy Rating Variability Study*. September 30, 2018. [https://bit.ly/2Hr2jtb]
2. Natural Resources Defense Council – *ESNET Board Takes Action to Enhance the Consistency of How Accredited HERS Software Programs Calculate HERS Index Scores*, by Jackie Wong and Madhur Bloor. December 10, 2018. [https://bit.ly/2VPrJEW]
3. RESNET 2013 General Session. March 10, 2013. [https://bit.ly/2tYNbv9]

Mike Collignon is the executive director and co-founder of the Green Builder® Coalition.

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## Time to Breathe Easy

NAHB-IBS 2019 offered key lessons in healthy home design and construction. Are you listening?

BY TERRY BEAUBOIS

**D**URING THE 2019 NAHB-International Builders Show (IBS) in Las Vegas, one key discussion addressed the issue of the health of home occupants, and the related residential design and construction. Human health in homes is becoming a major concern globally as more people discover that the source of an illness may be in their home.

This meeting was hosted by Bill Hayward of Hayward SCORE and was co-hosted by Jillian Cooke (Wellness Within Your Walls), Robert August (North Star Synergies), Karla Butterfield (Steven Winter & Associates) and Jaclyn Toole (assistant vice president, NAHB Green & Sustainable).

Included in the discussion was the challenge of introducing improvement into home construction: “Contractors pushing” ideas and improvements into residential design; “homeowners pulling” (requesting or desiring) that homes be designed to address and reduce environmental health issues; the increase of government regulations to require improvements; and the benefits and tradeoff of each.

“Design” is often thought of as only the visible, aesthetic aspects of a home. But a true green home, or a “Healthy Green Home,” means the design and construction includes all systems that will affect occupants’ lives. It also can include understanding how to achieve well-coordinated systems, and the relative costs of how this is to be achieved in construction with value engineering considerations.

### GREEN TEAMWORK MATTERS

The day after this Monday evening meeting, there was an official NAHB-IBS panel presentation and discussion, “Healthier Homes: How to Cost-Effectively Deliver Buyers’ Must-Have Features,” which emphasized how construction of a healthy home benefits from a team approach to the issues, the understanding of what’s at stake, and the perspective and experience of each of the team members: designers, homeowners and builders.

Issues such as air quality and water quality, materials and products, mechanical systems and acoustics all play a role in home and health-related issues. Balancing the elements of aesthetics, construction costs and features is an ongoing challenge in residential markets. We can also anticipate the future government requirements and regulations that will increase the level of how homes address health concerns, as well as possible testing requirements prior to the sale of a

house. These will be additional pressures on successfully integrating “Healthy” into “Green Homebuilding” for us all.

The elements involved in “Healthy” homes are compatible with Green Homebuilding and in fact, the combination can create the best homes. But it does take increased understanding and appreciation on the part of designers, builders and homeowners.

Issues such as air quality and water quality, materials and products, mechanical systems and acoustics all play a role in home and health-related issues. Balancing the elements of aesthetics, construction costs and features is an ongoing challenge in residential markets.

### YOU ARE WHAT YOU BREATHE

There is overwhelming evidence that people’s health in their home is directly affected by a wide range of materials, and the systems designed and built into homes. The quality of the air that occupants breathe, the water that they drink, and all of the environmental elements in and around each home play important roles in how homeowners feel while living in the homes that are now being designed and created. Achieving each requirement set for healthy home design may become a regular part of preparing a house for sale.

Some of the illnesses and health problems that people are experiencing in their current homes are a direct result of design problems and the selection of products and materials. If these are corrected, people’s health could improve—especially if the source of their illnesses are removed.

In a remodeling, addition or new home, many of the choices made about home design and construction are often done without the homeowner’s involvement. As a result, they may be unaware of the ramifications of these decisions. When possible, homeowner



**Home sweet home.** The quality of air, water and other environmental factors impacts how potential homeowners perceive new homes now being designed and created.

involvement and participation with health issues should be the beginning of the design process. Helping them determine what they want to actively support and how they can participate in regards to the design decisions—and better understand the ramifications relative to a new healthy home—will be important for all.

### SOME HOME DESIGN RESOURCES

Much has been learned about how to create a Healthy Home Design in recent years. Some specific ways to address issues related to health in homes exist now that did not exist a few years ago. Other ideas have been around for years, but not everyone is familiar with them. If you are planning a new home project or major remodel or addition, there are things you can be taking into consideration.

Here are two resources for both you and your clients to consider:

#### Hayward SCORE

Hayward has created the Hayward SCORE, a helpful survey you and your clients can use to identify the environmental issues for consideration in your home projects.

Hayward is dedicated to helping everyone understand the home environment: He and his family lived in a house that caused much

illness. Hayward’s family story is also included on Hayward SCORE’s website ([www.haywardscore.com](http://www.haywardscore.com)).

#### Measuring your environment: test kits

To determine what your environment is like, measure it. Fortunately a number of test kits are becoming available for this purpose.

Knowing the environmental conditions of your specific site is an early step in addressing any home health issues. Taking crucial steps in residential design and construction could result in occupants living 10-20 years longer.

The list of issues to address grows as more is understood—water quality, volatile organic compounds (VOCs), humidity and mold, and Internet of Things (IoT) for health in the home, are just a few. We’ll continue presenting resources to you as this field develops.

It’s time to consider building Healthy Green Homes. A good direction for us all. **GB**

*Terry Beaubois is an architect in Palo Alto, Calif. He is CEO of Building Knowledge Systems (BKS) LLC ([www.bksco.com](http://www.bksco.com)), and an adjunct lecturer at Stanford University.*



# AD INDEX

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[www.carrier.com/residential](http://www.carrier.com/residential)  
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## DuPont

Think twice. Build it once.  
[www.weatherization.tyvek.com](http://www.weatherization.tyvek.com)  
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## Jinko Solar

The future is bright with a smart solar home.  
[www.jinkosolar.com](http://www.jinkosolar.com)  
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## Panasonic

With great power comes great ventilation.  
[www.reinventingventing.com](http://www.reinventingventing.com)  
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## PERC

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## Rheem

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[www.rheem.com/sustainability](http://www.rheem.com/sustainability)  
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## Trex

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[www.trex.com](http://www.trex.com)  
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## Uponor

Progress means moving water flawlessly and efficiently.  
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## VISION House Seattle Cascades

The House the Experts Built  
[www.greenbuildermedia.com/vision-house-cascades](http://www.greenbuildermedia.com/vision-house-cascades)  
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## Whirlpool

#1. That's the position that Whirlpool brand holds when it comes to appliance sales in the U.S.  
[www.whirlpoolpro.com/number1](http://www.whirlpoolpro.com/number1)  
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As the boomer generation moves into its golden years, here are the aging-in-place tools that will help the elderly stay healthy and happy at home.



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# ALIGNPROJECT

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**THE ALIGN PROJECT** is a one-year demonstration project designed to challenge entrenched ideas about how we live in the U.S. and offer suggestions for how we can align our lifestyles with our changing socio-economic and environmental realities.

Whether we like it or not, the changing climate is demanding a sweeping overhaul of the way we live. Fortunately, advances in high-performance products and enabling technologies are providing viable solutions for enhanced efficiency, resiliency, sustainability, and connectivity.

The centerpiece of The Align Project is a small-footprint, net-zero, connected independent dwelling unit. The precision-engineered home takes



advantage of every square foot of space and comes with an integrated smart home technology platform, which seamlessly integrates devices, appliances, lighting, and mechanical systems.

Recognizing that sustainable living extends beyond the home, The Align Project also focuses on revamping our cities, energy infrastructure, mobility solutions, and finances, highlighting sustainable choices that align with our moral compass to ensure a flourishing future.



### Visit The Align Project

The Align Project has been permanently located in Downtown Las Vegas and available to visit!

If you're interested in touring or staying in The Align Project, contact [sara.gutterman@greenbuildermedia.com](mailto:sara.gutterman@greenbuildermedia.com).

### Project Sponsors



### For More Information

Visit [www.greenbuildermedia.com/vision-house-the-align-project](http://www.greenbuildermedia.com/vision-house-the-align-project) or email Cati O'Keefe at [cati.okeefe@greenbuildermedia.com](mailto:cati.okeefe@greenbuildermedia.com)



# FROM THE TAILGATE

New Offerings for the Sustainable Minded

By Ron Jones

## Building Irony

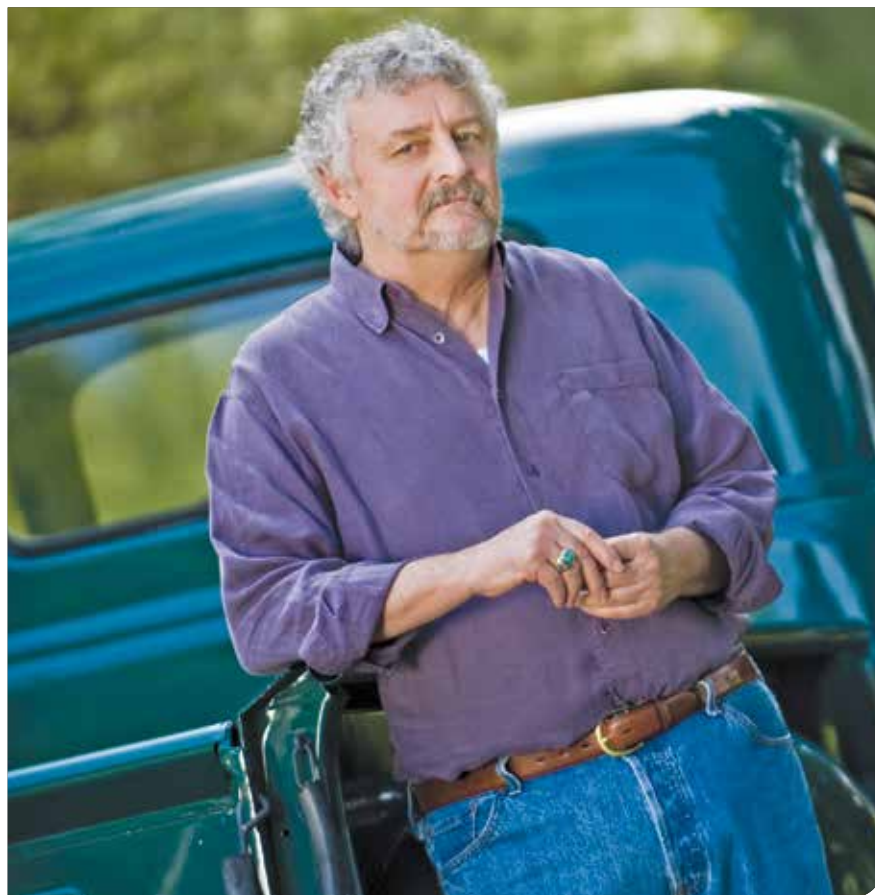
ONE OF THE GREAT IRONIES of the state of the housing industry in this country is that, for at least as long as I can remember, the people who actually build houses—carpenters, masons, plumbers, painters, roofers, concrete finishers, and so on—are among those least able to afford to own, and in many cases even rent, the residences that they build. In a small market like ours, this fact is especially poignant, since a disproportional part of our small workforce is engaged in the construction industry, second only to tourism-related endeavors that are mostly in the recreational travel and services sector. And, sadly, whether those workers make a living swinging a hammer or selling gasoline and pork rinds to summer visitors, their local housing opportunities are about the same: Poor at best.

Where I live, we have a really small population—only about 400 year-round residents in town and a total of about 800 in the entire county—but our area is highly desired by a variety of folks from other ZIP codes who have, or would like to have, second homes here. In fact, according to some of the local literature, our county boasts the second-highest percentage of second homes of any county in the nation.

So, while there are many existing dwellings in a wide variety of sizes, price ranges, ages and styles, a great number of them are occupied only on a seasonal basis. And those that are available as rentals mostly provide short-term lodging for visitors at much higher rates than the local workforce can afford. And even while there is a relatively robust residential construction sector here, with a core of talented and skilled practitioners, we still all find ourselves grappling with the same issues confronting much larger communities across the country: There simply isn't enough affordable workforce housing to go around.

There are plenty of business owners and entrepreneurs expressing their interests in expanding existing enterprises or opening new ones, but we can't seem to generate enough critical mass to get over the hump. Without the housing to support growth in the workforce, business owners can't attract enough help to expand their operations and grow the local economy. At the same time, there are not enough dollars being generated under current conditions to incentivize development of the desperately needed housing stock. The hamster wheel continues to turn, like some kind of perpetual motion machine.

Our local planning and zoning committee, sincere-yet-inexperienced



volunteers appointed by the town government, is endeavoring to come up with suggestions for strategies that could help end this frustrating cycle. Ideas for creating public-private initiatives, some involving small infill parcels belonging to the community, are being explored. Additionally, our zoning ordinances, most of which have been on the books for decades and are sorely in need of updating, are being reviewed to see how we can identify and implement regulatory incentives for land holders and building owners to invest in rental properties, as well as for-sale residences.

Local builders express interest in limited spec building, but are understandably cautious and don't want to get too far ahead of themselves. The complementary parts of the equation—increased business activity and the jobs that would create, and the additional housing that would attract and support an expanded workforce—must advance in careful coordination with each other, because they are so interdependent. In many ways, we are simply a microcosm of the affordable housing challenges that our industry and our society must overcome if we hope to prosper in the years and decades ahead. **GB**

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