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year's corporate Eco-Leaders explore
the "actual reality" of real change.**





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- Solving for energy and water, so that they do not become major inhibitors to growth and prosperity
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- Social justice issues as they pertain to the built environment on a local, national and global scale
- 2020 Sustainable Development Benchmarks: Where have we succeeded, where have we failed—and we go from here?
- The Built Environment Today: Are we designing and constructing properly for our changing climate and growing social and economic inequity issues?

SPEAKERS:



ANDREW WINSTON, globally recognized expert on how companies can navigate and profit from humanity's biggest challenges, and author of *Green to Gold*, *The Big Pivot*, and *Green Recovery*.



ED MAZRIA, founder of Architecture 2030 and internationally recognized architect, author, educator and visionary with a long and distinguished career.



GENE MYERS, CEO/founder of Thrive Home Builders, six-time winner of the Department of Energy's Grand Award for Innovation, and the first production builder to deliver "solar standard" homes, build net-zero communities, and use Colorado beetle-kill lumber in the construction of its homes.

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Green Builder® Media's annual Home of the Year Awards are recognized as one of the industry's most innovative and important programs that identify authentic, advanced, beautiful and sustainable projects and the professionals who design and construct them.

Green Builder® Media will celebrate our annual Home of the Year Awards winners at a special VIP dinner, held on January 19 at the elegant MR CHOW in Caesars Palace.

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EDITOR'S NOTE

The Inside Scoop

By Matt Power
Editor-in-Chief

Feeling Down? Try Some Actual Reality

TODAY'S MANY MAN-MADE crises can be addressed, but not if we listen to hucksters and sociopaths.

More often than not, predictions about the future get it wrong. As recently as the late 1960s, when the population was 3 billion, author Paul Ehrlich's warnings predicted in *The Population Bomb* that humans would overwhelm Earth's resources within 10 years, leading to vast famines, war and collapse. We'd be living in a "Soylent Green" world, eating each other to survive.

Fortunately, predicting the future is fraught with uncertainties. That's not to say Ehrlich's dire warnings won't come true eventually, but so far, at least, other factors—advances in farming, digital communication, and so on—have (mostly) headed off the worst scenarios.

Let us hope that the same uncertainty holds true with regard to the Earth's ecosystems. The extinctions and loss of habitat happening



now are real and dire, but perhaps not unstoppable.

As I stood in a hardware store the other day, the customer in front of me launched into a sudden and unexpected tirade about Barack Obama's birth certificate. He told the rather stunned-looking clerk that the fact that we had an "alien" as our president "ruined the country" and is the cause of all of our troubles today. He was literally sputtering with rage. The fact that we have a new president, he said, is irrelevant. The damage was done!

Sadly, there's an undercurrent of misinformation that has seeped into American culture, and it's doing none of us any favors. These sinister stories (and we do love our stories) are neither random nor unavoidable. Talk shows, TV networks

and hackers start them, and *anti-social* media amplify them.

I say *anti-social* because too often, they fuel our worst instincts, not our best.

Deep within the human psyche is a craving for self-destruction. If the world ends during our lifetime, then we were right, and the world DID go to hell in a handbasket!

Yes, we face massive challenges. Climate change is real, and the world is overheating. But solar energy has just passed all fossil fuels in price parity. It's now economically inevitable. Birth rates are dropping in many industrialized nations. Many nations have begun to tackle plastic pollution. We're close to a cure for Alzheimer's and early cancer detection, and on and on. Behind the dark clouds of misinformation, the future could still be bright.

Can corporations, like the ones highlighted in this issue, be part of that brightness? Possibly. But all companies need to stay in "actual reality" and do the hard work of course correction, rather than denying and obfuscating the facts.

I have friends with political views 180 degrees from mine. Yet we're friends. We do projects together, go fishing or just sit in silence, without butting heads about how the world will end. Listening, talking, working: That's actual reality. Blaming, raging, denying: That's the dead-end road to nowhere. **GB**

HOW AMERICANS THINK THE WORLD WILL END

Nuclear War	28%
Don't think there will be an apocalypse	20%
Climate change	16%
Judgement day	16%
Worldwide revolution	9%
Something else	8%
Zombies	2%
Alien invasion	1%

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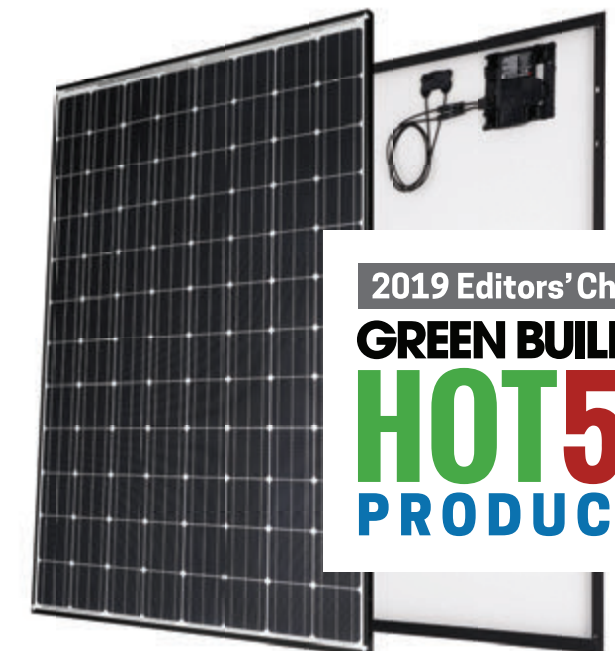
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Tom Knutson, Principal
K2 Signature Homes

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.

THE 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 for updated articles, videos, and news about the project.



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Green Building NEWS

The Latest on Sustainability and Renewable Energy

Garden State Goes All In for Green Power

New Jersey plans to switch off all non-renewable energy by 2050.

NEW JERSEY HAS UNVEILED an initiative to power the state entirely by renewable electricity by 2050, largely through expanded electric-vehicle adoption and offshore wind and solar unit installations. The proposal, known as the Energy Master Plan (EMP) will also create additional clean energy-related jobs and training programs, according to Gov. Phil Murphy. Also, many of the EMP's benefits will be aimed at underserved areas, such as low-income communities.

Murphy calls the EMP "a comprehensive roadmap toward achieving our goal of a 100 percent clean energy economy by 2050." It is "a critical step forward in reducing the effects of climate change and securing our state's clean energy future for the benefit of all New Jerseyans and for generations to come."

Other goals include maximizing energy efficiency and conservation; reducing energy use and emissions from the building sector through decarbonization and electrification; the expansion of statewide net-zero carbon home incentive programs; modernizing the grid and utility infrastructure; and leveraging the economic and environmental opportunities that clean energy provides, Murphy notes.

The New Jersey Board of Public Utilities will host public meetings to collect feedback and comments from key stakeholders until Sept. 16.



COURTESY OF PHIL MURPHY

Net-zero know-how. New Jersey Gov. Phil Murphy considers the state's Energy Master Plan critical to its fight against climate change

USGBC Unveils 'Outstanding Projects' of 2018

LEED Project of the Year will be decided by member online voting.

A CENTURY-OLD RHODE ISLAND home has been named as the U.S. Green Building Council (USGBC)'s "Outstanding Single-Family Project" of 2018. The Holt Residence in Providence, R.I., was recognized for its absence of harmful volatile organic compounds (VOCs) in its building materials, as well as the 1,000-gallon cistern rainwater capture system used for landscape irrigation, according to USGBC. Holt was one of 12 finalists recognized in the council's annual **2018 LEED Homes Awards**, which features "residential projects, developers and builders using LEED to improve quality of life and create healthier and more resilient communities, USGBC President and CEO Mahesh Ramanujam says.

Also identified as outstanding single-family homes were the Silverman Residence in George Town, Cayman Islands, and the Owen Residence in Little Rock, Ark.

Marshall Gobuty, president of Pearl Homes in Bradenton, Fla., First Community Housing in San Jose, Calif., and Brightview Senior Living in Baltimore was recognized as "Outstanding Developer."

Eighteen builders were recognized as "LEED Homes Power Builders," developers and builders who have "exhibited an outstanding commitment to LEED and the residential green building movement," Ramanujam notes. Power builders had LEED certification on at least 75 percent of their projects or unit count

built in 2018.

And for the first time, USGBC members were given the chance to vote online for the "LEED Homes Project of the Year." Results were not available at press time. A complete list of winners is available on the [USGBC website](https://www.usgbc.org/leed-homes-projects).



COURTESY OF USGBC

Standout effort. An extensive rainwater capture system helped make the Holt Residence in Providence, R.I., one of the winners of USGBC's 2018 LEED Homes Awards competition.



COURTESY OF PLANT PREFAB

Ready made. Two prefabricated townhomes were completely assembled in less than five hours, the first of 30 planned for the Olympic Valley area near North Lake Tahoe, Calif.

Speedy Prefab

Full-sized 'instant' homes make their debut at historic Olympic venue.

IT TOOK THE THREE MEDALISTS in the biathlon at the 1960 Winter Olympics in Squaw Valley a little over 4.5 hours combined to win their medals. That's also how long it took construction company Plant Prefab to install a 6,000-square-foot prefabricated duplex in the same area.

Plant Prefab, based in Rialto, Calif., quickly assembled the unit's six modules to create two complete three-bedroom, three-bathroom townhomes in slightly more than half the time allotted for the project. Builders originally estimated it might take eight hours to complete the job in what is now known as Olympic Valley, Calif.

According to CEO Steve Glenn, the build demonstrated how quickly and efficiently a prefab home can be built and erected, even during less-than-ideal weather-related work conditions. "A traditional build would have been nearly impossible," Glenn notes. "Building the modules in [our] climate-controlled facility and having on-site contractor and surveying work completed while the module builds were in progress cut the total construction time in half."

Plant Prefab is the first prefabricated home factory in the U.S. that employs sustainable construction techniques, materials and processes, according to Glenn. That includes drywall and insulation with the highest recycled contents commercially available, non-VOC paints and stains, low-energy lights, low-flow water fixtures, and Forest Stewardship Council-certified wood.

The Olympic Valley site will eventually have 30 such townhomes, most expected to be constructed within the next year. They will sell for an average of \$950,000 each.

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Once-Hot Coal Grows Colder

Renewable power continues to extinguish what was America's top energy source.

THE PUBLIC'S TASTE FOR COAL CONTINUES TO SOUR: Coal consumption in the United States is at its lowest level since 1978, with potential energy production dropping behind renewables for the first time, according to two industry-specific reports.

In 2018, Americans used 687 million tons of coal, with nearly all going as an energy source, according to the U.S. Energy Information Administration. That's down from the industry's peak of 1.13 billion in 2008. The steep drop is the result of increased capacity by power plants to run on renewable sources such as wind and solar—which officially surpassed coal in April—which itself resulted from renewables' lower operating costs, according to the Institute for Energy Economics and Financial Analysis (IEEFA).

Analysts note that coal's decline comes in spite of the Trump Administration's efforts to boost the industry by scaling back environmental regulations. Economics, they say, means more to the public than the number of restrictions placed upon a product's production and development. "Coal has no technology path," says Jeff McDermott, managing partner at investment bank Greentech Capital Advisors in New York City. "It's got nowhere to go but extinction."

IEEFA notes, however, that having the capacity to generate more electricity from renewables than coal doesn't mean it will happen immediately.



CREDIT: PEGGY DAVIS/ELIXIR

Lights out? The public's appetite for coal as an energy source has dropped dramatically in 10 years, largely due to the ever-more-affordable renewables, such as solar and wind.

It probably won't be a regular occurrence for at least several years, according to Matthew Hoza, senior energy analyst at consulting firm BTU Analytics in Lakewood, Colo.

It's All Garbage Now

Recycling becomes less 'right thing to do' and more 'what to do?' for U.S. cities.

ASIA'S GROWING DISINTEREST in American recycled materials is forcing many communities to curtail or discontinue their reusable waste collection and processing programs, because they are too expensive. This, in turn, is giving subcontractors such as roofers, builders and plumbers—and homeowners—a headache as they try to find somewhere other than the landfill to send discards such as scrap wood, nails and plastic wrap.

According to a report in the *New York Times*, China's 2018 decision to stop buying U.S. recyclables because of the excessive garbage they contained is a key reason many recycling companies have fewer buyers, driving up their costs. Some of those recyclers have responded by raising prices by up to 400 percent on their No. 1 customers: U.S. cities. This leaves many municipalities with an unpleasant choice of raising taxes, cutting city services or abandoning recycling altogether.



CREDIT: EVA CRISTESCU/FLOXOR

Trash talk. It's not as easy for cities to handle their recyclable waste—which is forcing them to find other, not-so-eco-friendly ways of processing it.

Mitch Hedlund, executive director of nonprofit Recycle Across America, notes that public participation in the high-cost recycling programs has been so successful that even handling all of a city's trash processing doesn't make life profitable for the waste management industry—which leads to recyclers or cities giving up on the idea.

In response, cities, builders and others are taking less-than-sustainable steps to handle their reusables. Philadelphia burns it instead of sending it to the landfill. Chicago has a new "grossly contaminated" classification for recyclables that contain even one non-recyclable item—sending the whole

batch to the landfill. Flagstaff, Ariz., pretty much only accepts specific bottles, jugs and jars. Memphis has all but dropped recycling services altogether, but still leaves bins in place to "preserve the culture" until mainstream recycling returns, the *Times* reports.



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A Leading Role

Being an eco-pioneer isn't a 'first' anymore—
as this year's class of elite green thinkers shows.

BY ALAN NADITZ

AS THE CLOCK TICKS toward a voluntary 2050 deadline for nations to level off their greenhouse gas emissions and become carbon neutral—and help keep global warming to around 1.5 degrees Celsius, or about 3 degrees Fahrenheit, an increase scientists expect is still minor enough not to cause permanent destruction to the planet's environment—many companies are doing their part by enacting policies calling for net-zero operations status even earlier, around 2030.

A very commendable effort. But does that make them Eco-Leaders? Not quite. Yes, they're acknowledging the truth of climate change and doing what must be done, and maybe they were the ones who threw down the pro-environmental gauntlet. But if everyone else has now taken up the challenge, those sustainably minded pioneers are not really "leaders" anymore.

Being an Eco-Leader means finding different and better ways to go about saving the environment, or newer and bolder ways to put existing efforts to use. That's what we found with this year's green thinkers: a group that's taken a step beyond simply closing the valves on the fossil fuel-driven exhaust ports in favor of cleaner renewable energy sources. And because this is a worldwide effort, this year we've chosen five recognizable names with ties to the green building industry (our "Building Industry Exemplars") and five outsiders whose tactics impact everyone (the "Aspirational Firms").

Several decades ago, while attending an obscure but "revolutionary" environmental conference, I had the pleasure of meeting a certain eventual (and now former) U.S. vice president who, even then, was very vocal about climate change, pollution and extinction of species. Something he said has stuck with me for almost 30 years: "Anything you do can make you a 'leader' if you're the first to do it. But to stay a leader? You need to keep being first, and make sure others are following you."

That's a goal we can all move toward.



Elevating Sustainability

Corporations need to correct course now to prepare for the financial challenge posed by climate change.

BY SARA GUTTERMAN

CORPORATE SUSTAINABILITY HAS EVOLVED far beyond a feel-good marketing strategy to engender goodwill and loyalty. It has become an economic and environmental imperative, as companies, policymakers and financial regulators across the globe recognize the risks associated with the failure to plan appropriately for climate change. Fortunately, corporations in all sectors of the economy are answering the call with innovative approaches to sustainability.

Armed with indisputable data and undeniable science, Rostin Benham, senior financial regulator and Trump-appointed member of the Commodity Futures Trading Commission (which oversees major financial markets) has publicly declared that the risks associated with climate change eclipse those posed by the mortgage meltdown that caused the 2008 financial crisis and ensuing recession.

"If climate change causes more volatile, frequent and extreme weather events, you're going to have a scenario where these large providers of financial products—mortgages, home insurance, pensions—cannot shift risk away from their portfolios," Benham

says. "It's abundantly clear that climate change poses financial risk to the stability of the financial system."

Behnam is not alone in recognizing the financial risks of a warming world. The European Central Bank recently issued a warning that an intense round of severe weather could destabilize global markets by negatively impacting the balance sheets of unprepared corporations that have not engaged in appropriate risk analysis and proactive planning.

The Carbon Disclosure Project (CDP) found that the world's 500 largest corporations face approximately \$1 trillion in climate change-related costs, the majority of which could materialize within the next five years.

It is estimated that the world's largest companies may have to write off or retire up to \$250 billion in assets, such as buildings in high-risk flood zones and outdated manufacturing facilities and power plants that can't meet tighter emissions regulations. It's important to note that this estimate only takes into account a fraction of companies worldwide that report their climate risks, and the actual dollar figure associated with these losses will presumably be substantially higher.

In response, companies are stepping up to the climate challenge, implementing comprehensive corporate sustainability plans, making

bold carbon neutrality commitments, and exploring the business opportunities that come with a warming planet.

AN ALTERNATIVE PLAN WITHOUT ALTERNATIVES

Companies across the sector are embracing renewable energy. Schneider Electric, for example, has committed to power its operations with 80 percent renewables by 2020, and Target has pledged to become 100 percent renewable by 2030.

Other corporations are making big investments in enabling technologies that solve for the risks associated with climate change. For example, Uponor and Belkin have joined forces to create *Phyn*, an advanced water monitoring and leak detection system, to address our growing water availability challenges.

Consumer goods companies are taking a hard look at ways we can tackle our global plastic waste plague. Procter & Gamble, for example, is developing shampoo bottles that utilize recycled plastic harvested from beaches littered with waste.

The building sector boasts plenty of Eco-Leaders. Ingersoll Rand—one of our perennial Eco-Leader selections—has shown the industry how to optimize sustainable operations and supply chain management. The company is now leading the charge with respect to the circular economy. Ingersoll Rand has reduced greenhouse gas emissions by 45 percent since 2013—two years earlier than its originally stated goal—and increased energy efficiency by 23 percent, water conservation by 38 percent, and renewable energy use by 32 percent.

Owens Corning recently adopted a revised definition of sustainability: meeting the needs of the present while leaving the world a better place for the future. After attaining a 49 percent reduction in greenhouse gas emissions, the company is developing a plan to become net-positive by 2030 through a number of science-based initiatives, including utilizing 100 percent wind-power-

generated electricity, supporting communities throughout the globe where employees live, and working to eliminate jobsite injuries and lifestyle-induced disease.

In the furniture sector, Room & Board is expanding its use of reclaimed wood, planting self-sustaining urban meadows, and supporting American artisans to reduce the environmental impact of overseas shipping and transportation.

Even fossil fuel companies are getting in on the action. Oil behemoth Royal Dutch Shell and mining giant Glencore have recently invested in new energy divisions and set environmental targets for the first time in their operating histories.

DEAD END AHEAD?

Companies aren't embracing sustainability simply because they feel philanthropic. Rather, they see the writing on the wall: At some point, they will need to shift their business models, strand their fossil fuel assets and make a serious course correction in order to remain in business, as governments around the world set ever-ratcheting policy to cut greenhouse gas emissions.

Furthermore, regulators and shareholders alike are demanding that companies reveal climate change-related risks. A recent wave of corporate disclosures confirm that companies in all sectors of the economy are bracing

for impact, acknowledging that climate change could substantially alter their business operations and negatively affect their profitability. Disruption of supply chains due to extreme weather and operating restrictions resulting from water shortages are the two concerns that top the list.

Let's hope that the heavy lifting currently being done by corporations today will provide the baseline that we need to bolster our economy and prepare us for the inevitable changes that will come as planet continues to transform. **GB**





Sun rise. Solar is a big part of Bosch's effort to be carbon neutral by 2020, such as at its plant in Nashik, India, where photovoltaic panels supply 20 percent of the city's needs, with an ultimate goal of 50 percent.



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Day tripper. The Bosch eBike System combines lithium-ion technology with an average rider's desire for easier, greener travel—a way of saving gas without getting gassed.

Bosch

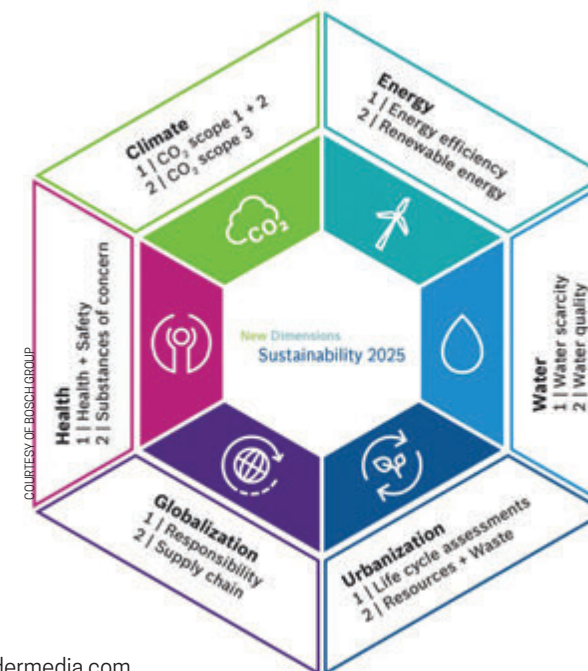
From smart appliances to synthetic fuels, sustainability efforts are a renewable thing.

BOSCH, IT SEEMS, has its hands in everything. The green building industry knows the company for its smart appliances, smart sensors and energy-efficient power tools. The public enjoys catchy products, such as electric bikes and synthetic fuels. There are programs that enable consumers to rent power-smart appliances, a home delivery service where riders on e-cargo bikes pick up recycling, a paperless electronics plant, a sensor program that tells farmers when they can apply pesticides to their crops, and more. What else is there for the technology services giant to do?

According to CEO and Chairman Volkmar Denner, plenty. The company's goals in the next few years stem from some of its current accomplishments. Those include reaching carbon neutral status by 2020—the greenhouse gasses the company produces has already dropped by 31.1 percent compared to 2007, with a target of 35 percent by end of next year; dropping waste production by 6.9 percent (already down 3.5 percent from 2015); using 6.9 percent less

water (currently at 6.3 percent lower from 2015); conducting 1,000 environmental and safety audit from 2010 to 2020 (only 138 more to go); and having 40 percent of its power consumption sustained by renewable energy such as solar and wind by 2030.

Being so close to reaching current goals, Bosch has established another half-dozen for the next six years. Known as “New Dimensions—Sustainability 2025,” the campaign sets “megatrends” targets for climate (via long-term supply agreements with only green energy providers and purchases of high-quality, “Gold Standard” CO₂ certificates), energy (behind a \$1.14 billion promotional and public education effort), water (25 percent reduction in extremely water-scarce areas, such as Brazil and India), urbanization (with additional emphasis on reducing hazardous waste and increasing its material recycling rate), globalization (such as by more clearly identifying the ecological and social risks in its supplier network) and health (such as protecting people and the environment by ensuring that banned or hazardous substances).



World greeters. Bosch's green strategy for the next decade is a combination of lifestyle trends and resource management.



“We see supporting the goals of the Paris Agreement as our responsibility, and we aim to do this with sustainable products, and, above all, by taking immediate action ourselves.”

Volkmar Denner,
CEO/Chairman of the
Board of Management



Playing it smart. From automated sensors that detect deadly gas leaks, to self-driving robots that can improve production on an assembly line and prevent workplace injuries, LG is looking to the future to improve the present.



A quiet success. Sustainability doesn't always have to be flashy to catch public attention—a super-efficient, compact and award-winning A/C can also do the trick.



Circular thinking. LG's efforts toward Passive House promotion sometimes takes unusual turns, such as with this plant tube, designed to help grow more than 1,000 plants to clean carbon emissions from the air.

LG Electronics

For this technology giant, it's all about thinking smart.

AT FIRST, IT'S an odd-looking thing: a rectangular, almost "Tiny Home" with a curved fence on its roof, a couple sloped patios outside, and a statuesque horizontal tube out back that looks like an unfinished tunnel. But then you see the solar panels on the porch, the electric charging station on one pillar, and the plants—lots of tiny plants—growing all over the backyard.

It's LG's way of mingling one type of green with another. This passive house—a.k.a. Passivhaus—is a company showcase, filled with products designed to grant a sustainable lifestyle without sacrificing comfort. The solar panels power the charger, the A/C, the heat pump. Advanced technology tracks the energy consumption of each connected device—TV, monitors, washing machine, smart speaker and refrigerator—in real time and automatically supplies the ideal amount of electricity, conserving power and the planet's resources. Residents also have the convenience of voice control via Google Assistant, enabling them to control

the lights, oven, blinds and more.

And all those plants? Their duty is to help clear the air of CO₂ emissions. These few dozen bushes, vines and young trees will eventually have hundreds of friends. It's an effort that meshes with LG's recently announced goal of going carbon neutral by 2030—cutting emissions from 2 million tons in 2017 to 960,000 in 13 years—largely through expanded solar energy-driven installations and LG's own technology, such as its energy management systems.

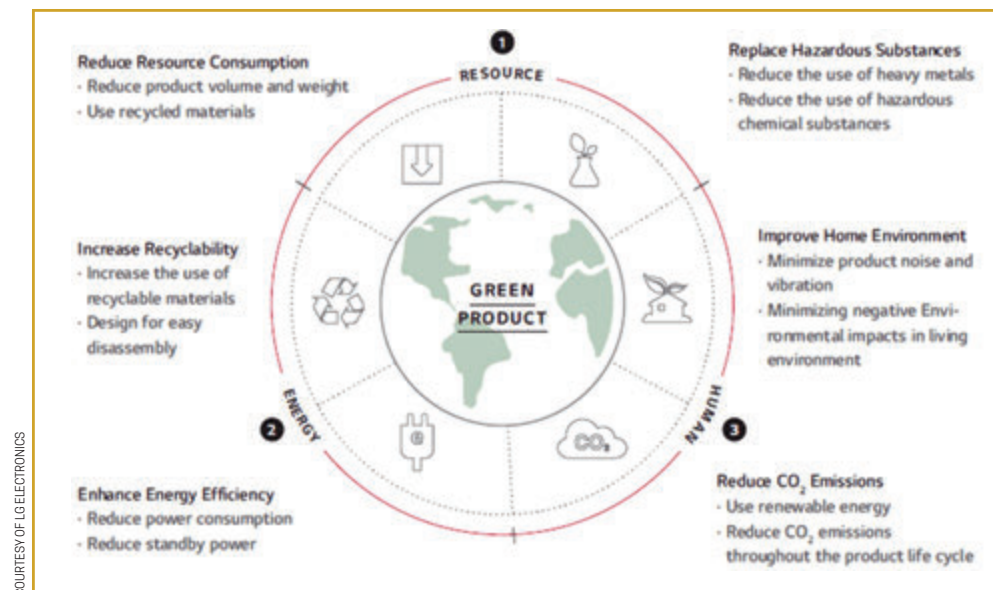
This, and a consumer-oriented campaign—"Life's Good—Experience Happiness," designed to teach sustainable thinking to 5.5 million young adults by 2021—has people noticing. In 2019, LG Electronics received 2019 Edison Award in the Energy & Sustainability category for its ultra-efficient air conditioning technology, and the NAB Leadership Foundation's Corporate Leadership Award for the company's environmental sustainability, social impact, employee volunteerism and disaster relief efforts.



COURTESY OF LG ELECTRONICS

"We look for ways to open up various business opportunities, such as an AI platform that evolves according to the needs of users, and setting up an open ecosystem for webOS. We will strive to find new opportunities in the rapidly changing business environment and become a sustainable company."

Il Pyung Park, President/Chief Technology Officer



Game plan. LG Electronics has a three-part strategy to securing its status as an Eco-Leader, setting goals for people, energy and resources.



COURTESY OF RHEEM MANUFACTURING

Charging ahead. By 2025, HVAC giant Rheem Manufacturing wants to lead by ultimate example—which is why it's now getting aggressive with its sustainability goals.



COURTESY OF RHEEM MANUFACTURING

Test case. The Fort Smith, Ark., production facility is the testing ground for an effort to reduce use of plastic, excessive packaging and waste to landfill—an approach that will be rolled out worldwide by 2025.



COURTESY OF RHEEM MANUFACTURING

Future world. By the mid-2020s, an estimated 250,000 plumbers and contractors will be trained on use of sustainable products, sustainable installation and recycling best practices—a goal Rheem considers extremely achievable.

www.greenbuildermedia.com

Rheem Manufacturing

If all goes according to plan, 'Good' things will soon turn out great for the environment.

THERE'S GOOD FOR one, and there's good for all. By opting for a "Greater Degree of Good," Rheem is wholeheartedly embracing the latter. In early 2019, the heating and cooling products giant launched the GDG campaign to get everyone's mind on sustainability, whether it's from improved innovation, better efficiency or stronger leadership.

Not that the company lacked in these areas. Rheem's sustainability numbers already showed great progress in green leadership: 134 million gallons of water saved annually at its various factories, enough for 500,000 eight-ounce drinks at just one of its production facilities; 2.5 million fewer pounds of air conditioning packing materials used company-wide each year; and 195 million fewer kilowatts consumed at its Mexico facilities. Rheem hopes to improve on those totals as it strives for drastically reduced emissions and landfill waste numbers by 2025.

GDG takes a three-prong approach:

Within five years it hopes to have firmly in place a line of heating, cooling and water heating products that boast a 50 percent reduction in greenhouse gas footprint. This in turn will help Rheem achieve zero waste going to landfill at its global manufacturing operations. The company also plans to train 250,000 plumbers and contractors—about one-third of the overall industry—on sustainable products or sustainable installation and recycling best practices.

Meanwhile, the company will continue producing its line of award-winning environmentally friendly goods, such as tankless water heaters, smart thermostats, furnaces, air conditioners and more, according to CEO Chris Peel.

"We all feel a shared responsibility to reduce the natural resources required to make and use our products, and we are excited about the opportunity to effect positive environmental change through these purposeful actions," Chris Peel says. "By working together—Rheem associates, our contractors and consumers—we will create a Greater Degree of Good."



www.greenbuildermedia.com



"Sustainable thinking is embedded in everything we do. It's in our products, processes and in the way our people think and act. I'm very confident that the team will achieve these goals and truly make a difference."

Chris Peel, President/CEO

Mass appeal. Rheem's "Greater Degree of Good" campaign challenges consumers, builders and even its own employees to up the ante when it comes to going green.

July/August 2019 **GREEN BUILDER** 23



New look coming. More than 1.5 billion plastic bags are turned into eco-friendly, wood-alternative outdoor living products.



Making things happen. Trex's manufacturing technique for its decking and railing products keeps the company at the forefront of the green building industry.



Team effort. Each year, thousands of students participate in Trex's Plastic Film Recycling Challenge, designed to teach people how to dispose of waste plastic.

Trex

This company's specialty is putting plastic back to work.

FOR MORE THAN TWO DECADES, Trex has turned detrimental waste plastic into something useful. The company innovatively recycles the material by including it in its composite decking and railing products—a fact it shares to help people think green.

The company keeps more than 500 million pounds of plastic film and reclaimed wood out of landfills each year, recycling them into eco-friendly decking and outdoor living products that are more Earth-friendly than real wood. Its high-end decking is 95 percent recycled material, which CEO Jim Cline views as a sign of “sustainability in our DNA.”

Trex gets the good word out. An annual Plastic Film Recycling Challenge draws thousands of kids from hundreds of schools, all trying to prove they're the best at gathering and properly disposing of plastic shopping bags, bread bags, case overwrap, bubble wrap and more. A similar program exists for colleges and local communities.

Trex also buys unwanted waste plastic from businesses through its Commercial Recycling Partnerships program. Pro-recycling literature is freely distributed. The company's annual report highlights how its products result in 36 percent fewer greenhouse gas emissions, 47 percent fewer air pollutants, 84 percent less acidification, 53 percent less smog and 93 percent less ecological toxicity. The company is taking steps to keep things clean inside as well. Energy-saving initiatives, such as variable-speed equipment, heat exchangers to reuse heat, and new lighting systems controlled by motion sensors are in place at Trex plants. A water conservation project is nearing completion at its plant in Virginia, as are efforts to use GPS systems to optimize warehouse operations, and use rail lines for shipping instead of trucks. A longer-range—and more challenging—goal is for Trex to find a way to recycle or reuse its decking, for which no options currently exist.



“Our adherence to our company's core values continues to resonate with customers—both contractors and consumers—who understand the importance of environmentally conscious building.”
Jim Cline, President/CEO



All wrapped up. As public opinion of single-use plastics sours, companies like Trex have taken the initiative to encourage recycling among consumers and retailers.



“Whirl’d” leader. While the public’s view of the environment has changed a lot in the past 50 years, Whirlpool’s still doing what it did in 1969: finding the best ways to go green.



Seafaring sustainability. A plastic reclamation project in the UK and Italy could mean removal of thousands of pounds of waste materials each year from Atlantic waters.



A habit of helping. Whirlpool continues to support Habitat for Humanity’s affordable homes projects by supplying energy-efficient appliances and almost \$107 million in commitments over two decades.

Whirlpool Corporation

Even after half a century, new green frontiers are still being reached.

WHEN WHIRLPOOL BEGAN integrating sustainability into its operations, Richard Nixon was president, mankind was about to conquer the moon and “going green” had a very different, politically incorrect meaning. Fifty years later, the home appliance giant is still finding ways to make employees, retailers and the public pay attention to the environment.

The company follows a “three Ps” green strategy: Sustainable Plants, which includes efforts such as the prioritizing and tracking of efficiency improvements—which helped cut greenhouse gas emissions by 7 percent from 2017 to 2018, the equivalent of 10,000 homes’ electricity use annually; Sustainable Products, such as a new global emissions management system, which unifies 12 footprint-measuring methods into one global reporting capability; and Sustainable Practices, which includes water reduction processes and technology to cut consumption by nearly 10 percent from 2017 to 2018 in the company’s manufacturing facilities. That’s enough to run 56 million dishwasher loads

or fill 240 Olympic swimming pools.

Whirlpool’s green presence is being felt outside the workplace as well. The company is using automated *Seabins* along the coasts of the United Kingdom and Italy to collect 3.3 pounds of waste plastic out of local water per bin each day, primarily in the form of shopping bags and beverage bottles. A successful run could bring the tool stateside. The company has over the past two decades donated nearly 200,000 energy-efficient appliances to Habitat for Humanity for the organization’s affordable homes projects. And the ReNEW House, Whirlpool’s live-in research laboratory at Purdue University, continues to develop ideas on how consumers, their homes, systems, appliances and the grid can work together in a more environmentally responsible fashion.

It’s a tall order, but nothing that Whirlpool can’t handle, according to CEO Marc Bitzer. “At Whirlpool, we believe in doing the right thing, because there’s no right way to do a wrong thing,” he says. “Doing the right thing compels us to embrace sustainability in all its dimensions.”



The three Ps. Whirlpool’s sustainability strategy centers upon how to get things done, where it happens and what the end result should be.



“Successful and vibrant communities are the foundation of a great business. That’s why Whirlpool is committed to maintaining strong connections in our communities and being a leader in social responsibility and volunteerism.”
Marc Bitzer, CEO/
Chairman



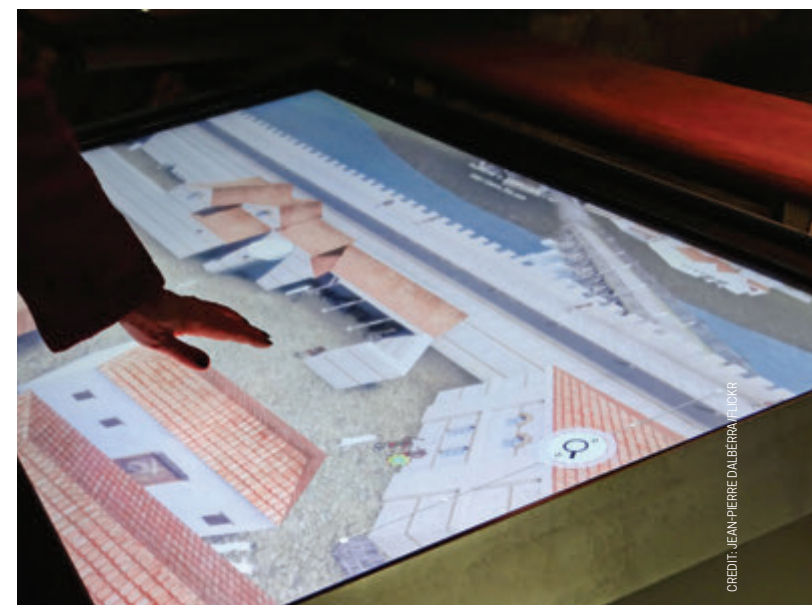
CREDIT: SOLAR IMPULSE FOUNDATION

A lofty goal. 3DS technology helped operators of *Solar Impulse* design a plane capable of flying around the world without using fuel.



CREDIT: JEAN-PIERRE DUBREUIL/FILIX

Sight seeing. Virtual reality is transforming from a recreational tool for individuals to a full-spectrum experience involving dozens of people simultaneously.



CREDIT: JEAN-PIERRE DUBREUIL/FILIX

Virtual road map. Dassault Systèmes' offerings include holistic, virtual models of past and present cities, which help builders understand what may and may not work with sustainable planning.

Dassault Systèmes

Sustainable thinking and technology are becoming partners in the 'Industrial Renaissance.'

BERNARD CHARLÈS HAS two words for what he sees happening with world business: "Industrial Renaissance." The CEO of Vélizy-Villacoublay, France-based, believes that to succeed in the coming decades, people will need to go beyond "thinking outside the box." They're going to have to rethink the box.

Dassault, the "3DEXPERIENCE Company," provides companies with virtual reality-type solutions to everyday problems, such as a more aerodynamic and fuel-efficient automobile or more-durable wind turbines. There are also real challenges—just ask about *Solar Impulse*, the plane powered only by the sun, which flew around the world in 2016 without using a drop of fuel. Or the digital twin of the French city of Rennes, that fully depicts its architectural layout and infrastructure, giving architects and planners a chance to figure out how it needs to be redesigned to fully provide water, clean air and electricity to a growing population. These simulations are by no means simple—some, at first, called them impossible—but they

exemplify the kind of thinking needed to keep up with an ever more tech-dependent society.

Dassault practices what it preaches, using its 3DS technology to sustainably design its North American headquarters in 2011. The 27-acre campus includes more than 2,000 tons of recycled steel, and 61,000 tons of structural materials were reused as fill. The HVAC units use a chemical-free electrostatic water treatment unit instead of chlorine. Overall energy use is reduced by 29 percent through a combination of high-efficiency rooftop HVAC units and boilers. Its design awards include LEED Gold certification. In 2018, the French company was named "Most Sustainable Company in the World" by the Corporate Knights Global 100 Index, considered the gold standard for corporate sustainability analysis.

"Tomorrow's game-changers will not be those with the most automated production systems," Charlès says. "[Instead, it's] those who build a culture of knowledge and know-how to reveal and train the workforce of the future, able to solve the challenges of a planet lacking sustainable solutions."



COURTESY OF DASSAULT SYSTÈMES

Industry Renaissance.

Technology's multi-faceted grip upon society means companies must take new approaches to challenges such as climate change or risk being seen as outdated, according to Dassault Systèmes CEO Bernard Charlès.



"We can no longer see the world merely as an object. To create a sustainable world, we cannot simply carry on as we do today. A sustainable world calls for more imagination and innovation in science, uses and economic models." Bernard Charlès, CEO/Vice Chairman



Megawatt mega-walk. Some of Invenery's projects are quite sizeable, such as the Grand Ridge Solar Farm near Streator, Ill., the largest solar farm in the Midwest when it was built in 2012.



Well-structured success. Invenery's Lackawanna Energy Center in Jessup, Pa., recently received LEED Gold certification for its design, which is 60 percent more efficient than similar buildings.



Starting a "moovement." The cover to Invenery's 2018 sustainability report succeeded in multiple ways: It drew attention to alternative energy, revealed that the company had a sense of humor and made more people want to read the report.

Invenery

Sometimes, success comes in all forms—even from those with four legs.

IT WAS THE photo that caused a mini sensation last year: A picture of four cows on grazing land, with a windmill in the background. An invite on the company's Instagram page asks visitors to "join the moovement." It was the most-liked photo on that page for all of 2018.

The company? Invenery. The reference? The company's efforts at developing and storing renewable energy for clients worldwide. It's a cause the Chicago-based green power giant had fun promoting when it grabbed the pic for its *Invenery Impact: 2018 Sustainability Report*. But then, Invenery often takes a slightly longer look to see if there's a different, better way to complete a project.

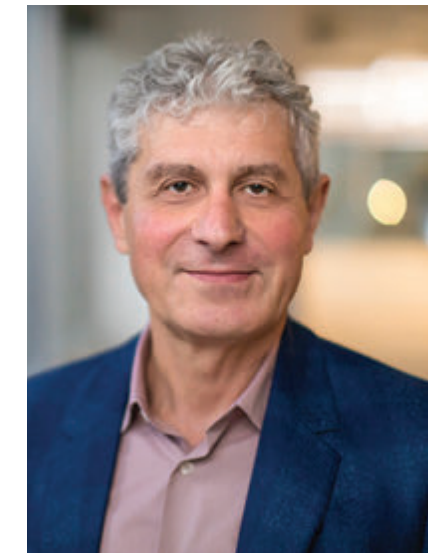
There's the Miami Wind Energy Center in Northern Texas, where employees made raised garden beds from used old gearbox oil containers. Invenery's relocated downtown Denver branch suddenly became the place where employees biked to work instead of driving, which all of them did previously. The switch to *Workday* and *Oracle*, two cloud-based administrative software tools,

cut down on printing and helped the company slice paper costs nearly in half—despite a 7 percent increase in number of Invenery employees.

Invenery also pursues renewable energy projects in small rural communities, because it gives the younger generation a chance to work and stay in the town where they grew up, instead of moving away. It has invested \$160 million in home communities to help stabilize the local economies by providing jobs and additional tax revenue.

Of course, there are the environmental benefits. Invenery projects in 2018 offset an additional 14 million tons of carbon dioxide emissions, the equivalent of planting 300 million trees or taking 500,000 cars off the road. All told, there are now more than 22,600 megawatts of projects in operation, under construction or contracted worldwide.

"Sustainability is about more than just advancing innovative renewable and clean energy technologies," CEO Michael Polsky says. "It's about environmental stewardship, community investment and empowering people."



"I am an engineer and an entrepreneur, not an environmentalist or a social activist. But I do what makes sense. Sustainability just makes sense."
Michael Polsky, CEO



CREDIT: MOSS

Fact finders. When it comes to revealing what Invenery is about, these notes say it all.



Higher purpose. Neste specializes in alternative fuels for transport, business and consumer needs, but it also wants to take the lead in educating the public about climate change.



Crude venture. Neste officials are meeting with counterparts in Southeast Asia to discuss ways to develop sustainably sourced palm oil instead of clearcutting.



Alternative thinking. After a string of successful alternative fuel ventures, research continues in the effort to find the next big breakthrough.

Neste

By offering low-emission fuels to replace fossils, this firm is cleaning up the transition to renewables.

IN THE PAST 20 YEARS, Neste has made a name as the alternative fuel company. The Finnish corporation specializes in renewable and low-emission options to diesel and crude oil-based consumables, instead powering vehicles, planes and factories with product derived from such exotics as vegetable oil, corn oil residue, and animal and fish fats. Its efforts have placed it on the renowned Corporate Knights Global 100 Index of World's Most Sustainable Companies a record 13 times, including spots at Nos. 2 and 3, respectively, in 2018 and 2019.

For many companies, that would be enough. But Neste has another reason for continuing to expand research on cleaner fuels: It's getting hot. CEO Peter Vanacker is aware of the discussion and near-panic over the Paris Agreement and its 2050 deadline for greenhouse gas emissions (GHGs) to be net zero in order to prevent irreversible damage from climate change. Neste is doing its part: All of its factories were converted

to alternative fuel use several years ago, and the company's target of preventing 9 million tons of GHGs by 2022 is well in sight. But Vanacker knows fighting climate change is not a solo act.

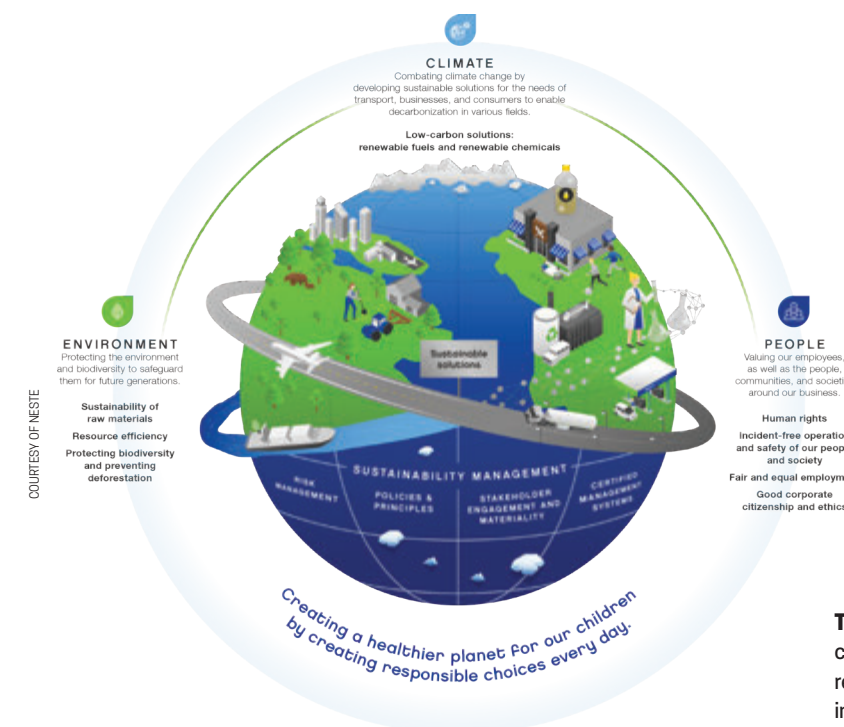
"Combating climate change is everyone's business," he says. "We can create a safer and more resilient future and leave a healthier planet for our children when we work together to readdress how we produce and consume energy, food and water, and how we safeguard the world's oceans and forests."

That's how an effort to make Lidö Island in the Swedish Archipelago fossil-free in one year began, to see how fast it could be done in a populated area. The total dropped by 78 percent, which Neste considers a huge success. In 2018, the company began meeting with authorities in Southeast Asia to help them shift toward sustainably produced palm oil. And the same year, Finland's Plastics Roadmap, the first of its kind in the world, mapped a path to chemical recycling of plastic waste.



"The climate challenge is indeed staggering...the outlook surrounding this challenge, however, should be one of hope, not fear. After all, when passion and optimism are turned into action, the results can be considerable."

Peter Vanacker,
President/CEO

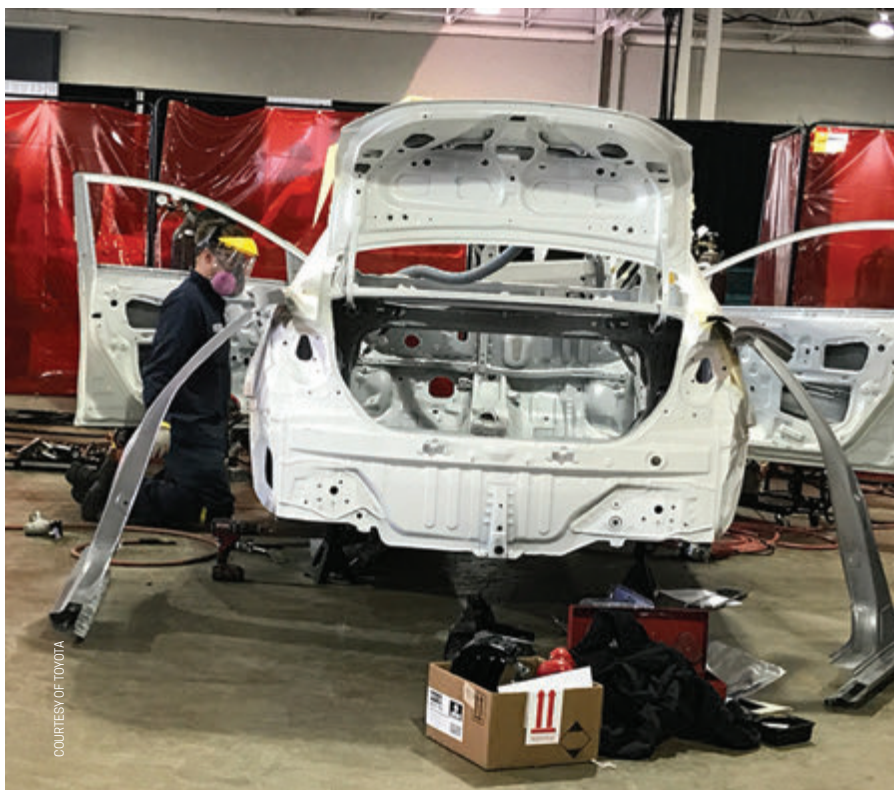


Thinking ahead. Neste consistently attempts to reduce its environmental impacts.



COURTESY OF TOYOTA

Photo(voltaic) finish. Toyota North America's headquarters has more than 20,000 solar panels that generate almost one-third of the power it needs to function.



COURTESY OF TOYOTA

Well-framed. A design improvement method has led to a 24,000-pound reduction in materials needed during automobile assembly.



COURTESY OF TOYOTA

Simple science. Toyota's new hydrogen-based, compacted SimpleFuel system can store in smaller spaces, making it usable with fuel-cell forklifts in assembly plants.

Toyota Motor Corporation

This automaker's lofty goal: reducing the life cycle impacts of vehicles.

CALL IT THE "Four Good Groups." Many companies have set green goals for 2030 or even 2050 that take primarily one pro-environmental action. Toyota North America spreads it out and has four key focus areas as it heads into the 2020s: carbon, water, materials and biodiversity.

There's an 8.79-megawatt solar system in place at its headquarters in Plano, Texas, that will power nearly one-third of the plant and prevent nearly 7,200 metric tons of carbon dioxide emissions. The company co-sponsors the National Mayor's Challenge for Water Conservation, which helps raise the nation's collective I.Q. about water use. A team at its Indiana assembly plant discovered 23 areas on the Toyota Sienna's underbody where manual PVC spraying could be reduced or eliminated, cutting raw material use by 12 tons. And Toyota's Woodstock assembly plant in Ontario, British Columbia, established a wetlands walking trail to give the local community a chance to experience nature firsthand. As CEO Jim Lentz puts it, the ultimate goal is to "create a positive impact

on the planet and society."

Toyota North America's actions are part of the overall corporation's "Toyota Environmental Challenge 2050," six goals designed to make the automotive giant an example of green business management by mid-century. The challenges—cutting average new automobile CO₂ emissions by 90 percent from 2010 levels; eliminating all CO₂ emissions from the vehicle's life cycle; achieving zero carbon emissions at all plants worldwide; minimizing water usage and implement water discharge management based on local conditions; promoting global deployment of end-of-life vehicle treatment and recycling technologies; and connecting its nature conservation activities with those of other companies and communities—are a work in progress.

"Nothing about Challenge 2050 is simple, except the reasoning behind it," notes Kevin Butt, director of sustainability for Toyota North America. "We know that our future—our health and well-being—depends on clean air, clean water and diversity in nature to provide us with medicines and other ecosystem services."



Challenge accepted. In response to public opinion and its own pro-environmental goals, Toyota formulated six green challenges ranging from reduced carbon emissions to better harmony with nature.



"Across Toyota, we've pledged to create a net-positive impact on society and the planet by 2050. By net positive, we mean going beyond just eliminating our negative impact, to helping create widespread, meaningful change."

Jim Lentz, CEO, Toyota Motor North America



A different view. Even though it's responsible for many of society's most common products, Unilever likes to do some things differently—as its headquarters in Rotterdam, Netherlands, clearly shows.



Forest savior. Unilever, which uses only sustainably sourced plant-based resources, has taken a strong anti-deforestation stance.

Unilever

With its carefully controlled supply chain, Unilever is setting new industry standards.

IT'S NOT OFTEN that a company will take an action that is harmful to its business, but executives at Unilever did just that in 2010, when the company opted to make deforestation one of its top three transformational goals for the end of the decade. One of the key products derived from destruction of rainforests is palm oil, a key ingredient in some of what the Dutch company sells to consumers. Unilever's supply chain is entirely of sustainable origin, but the commodities that drive deforestation "will continue to be stigmatized in ways that will negatively affect us," according to CEO Alan Jope.

The consumer goods giant oversees brands such as Dove, Lipton, Knorr, Surf, Best Foods and Ben & Jerry's, to name a few. An estimated 2.5 billion people use something tied to Unilever, which gives it insight into what consumers like, don't like, need and don't have.

That's what has led to recent efforts, such as technology that recycles sachets into

safe, high-quality reusable polymers; a new waste-free shopping and delivery pilot in which products are shipped to consumers, then returned and refilled; a toilet spray that disinfects and eliminates odors without the need to flush; and even a television commercial campaign about the merits of handwashing that has helped reduce the spread of germs in developing nations.

Unilever was also a key player in the creation of the UN Sustainable Development Goals (SDGs), a 17-point world improvement action plan set for 2030. Acknowledged by more than 170 nations, the goals range from the end of poverty and hunger, to global green partnerships. Unilever's own Sustainable Living Plan was a precursor to SDG and is still the company's blueprint for sustainable growth. "We don't pretend it will be easy," Jope says. "Change never is. Nor do we claim to have arrived there yet. But we are on the journey, and we hope that many other companies will also seize the opportunities that the SDGs present."



"New technologies, new business models, new ways of thinking and new collaborations—they are all vital to creating the inclusive growth that will ensure a sustainable future for the world, its people and our business."
Alan Jope, CEO



Multitasker. In taking a role as a world green leader, Unilever's goals for the next 10 years are existential, environmental and professional.

THE HOUSE THE EXPERTS BUILT

Green Builder® Media embarks on its next extraordinary demonstration project: a stunning dream house that doubles as a template for sustainable building that pros and homeowners across the nation can emulate.



A grand 'Vision'. VISION House® Seattle Cascades: The House the Experts Built will feature the most advanced products, systems and technologies to achieve extraordinary performance results—all at an affordable price point.

BY CATI O'KEEFE

BUILDERS AND ARCHITECTS design houses of all kinds in this country, but given a chance to create homes for themselves, what do you think they would build?

One example is under way right now: the personal home of Meritage Homes Vice President of Innovation C.R. Herro. The house is on a spectacular 20-acre parcel in Enumclaw, Wash., approximately 30 miles southeast of Seattle at the base of Mount Rainier National Park. The project will unite sustainable design techniques with advanced products, systems and technologies for optimized performance and wellness at a reasonable price point.

Follow Herro's house build as it progresses from the conceptual idea of recreating the feeling of his grandparents' home, through the choices made for high performance and design, and culminating with a stunning sustainable net-zero masterpiece, ready for vibrant living in spring 2020.

This show home project—the VISION House® Seattle Cascades—brings together the greatest minds in the building industry to redefine what it means to build green homes in today's marketplace. The home will serve as a simple, replicable application of innovative design, progressive building science and thoughtful green building, which professionals and homeowners throughout the nation can follow.

Green Builder's coverage of this show project will highlight the gamut of issues that building professionals and consumers should consider when building in today's market, including novel design approaches, advanced products, enabling technologies, efficient building systems and renewable energy.

INITIAL LEARNINGS

The goal of the project is lofty: to redefine sustainability and set a new standard for building green in the current marketplace by blending sustainability, quality, durability, intelligence and wellness with affordability.

To achieve optimal results, Green Builder and Herro gathered some of the greatest minds in the country, including internationally acclaimed sustainable architect Stace McGee and award-winning green builder Ted Clifton, along with the most innovative product manufacturer partners. (See *Sponsors In the Spotlight*, page 42).

Off-grid, net zero and connected, the VISION House® Seattle Cascades will feature a Panasonic solar system (with storage); a robust Control4 smart home system that will optimize performance and connect all of the lighting, devices and mechanical systems with the solar power system; radiant heating by Uponor; super-efficient windows from Western Windows Systems designed specifically for the Pacific Northwest climate; stone-coated steel roofing from Boral; durable manufactured stone from Cultured Stone; energy management system from Square D; high-performance fireplace glass from Schott; and resource-saving KitchenAid appliances.

The home will be off-grid with respect to water and sewer, as well as energy. "I was pleasantly surprised at how easy it was to unplug in the Seattle climate," says Herro. "Utilizing rainwater harvesting and an atmospheric generator that pulls water out of the air, I'm going to have twice as much water as the typical American home needs."

For the most part, the process has been engaging, educational and enriching. "I love this project," says Herro. "I love working with all of the manufacturer partners,

COURTESY OF ENVIRONMENTAL DYNAMICS



Cooking with class. The open kitchen will boast energy-efficient appliances from Whirlpool, high-efficiency windows from Western Window System, and an LED lighting package.

experts and incredible minds that we have brought together.”

But, as most projects do, the VISION House® Seattle Cascades project experienced some unexpected setbacks, including lengthy delays in the permitting process. It doesn’t matter who you are in King County—leading production builder or first-time homebuyer—you wait in the queue. But it’s important to talk about these issues and others that may cause delays or added costs, because it is what typical builders and homeowners also face when embarking on a new home project.

SIMPLE WORKS

One lesson that unfolded as the project launched is the importance of keeping things simple. “Herro’s initial sketches incorporated simplicity of design and economy of scale, so it was easy to translate them into an excellent example of a modern-day high-performance, healthy home,” says Stace McGee, the project’s architect and founder of Environmental Dynamics, Inc. “However, all of our partners, understandably, wanted to put their best foot forward and showcase their most advanced products. To keep the home at

a reasonable price point and create something that is replicable across the country, we had to make hard choices and reduce the bells and whistles.”

This made for some difficult decision making, but was important to keep the project on track—particularly with some of its out-of-the-mainstream precepts.

“Anytime you’re trying to do something different, the usual systems break down in terms of permitting, contractor channels and the like, so you can’t follow a normal process, which effectively doubles the cost

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WHAT’S SO EXCITING ABOUT THE VISION HOUSE® SEATTLE CASCADES?

“It’s not often that the opportunity comes along to redefine sustainability and set a new standard for building green in the current marketplace—to design and build a template that can be replicated across the country—but that’s precisely what Green Builder® Media is aspiring to do with the next project in our VISION House® demonstration series.”

**Sara Gutterman, CEO,
Green Builder® Media**



“During the economic downturn from 2007 through 2016, I was able to take the time to conduct a lot of research on various aspects of energy-efficient home construction. During those years, we were able to test and prove our work, but only on our own projects. The VISION House® project offers us an opportunity to work closely with other top industry professionals in a manner we can all learn from. This project is as much about sharing knowledge as it is about building a house, not just between ourselves, but with the greater world of homebuilders and homeowners.”

Ted Clifton, builder, Clifton View Homes



“It is exciting to collaborate with some of the top green building experts in the United States. Our united mission to share our knowledge regarding sustainable homes is inspiring. Hopefully, through sharing our experiences, we can encourage others to create a more sustainable built environment and a brighter future for us all.”

**Tadashi Shiga, energy rater,
Evergreen Certified**



“An exciting aspect of this project is that it will empower homebuyers to understand how the home works. It needs to be simple enough that they will want to monitor and interact with it. We give them what they need to change their behavior and help them understand how they can make simple changes in their lives, so that their home and lifestyle have less impact on the environment.”

**Stace McGee, architect,
Environmental Dynamics**



“The obvious answer is living in it! But as a member of the better-building community, I am actually most excited about seeing what happens when you collaborate with the best of the best to build a singular example of how a contemporary home should be built—from the minutiae in optimizing exhaust vent runs and limiting roof penetrations, to advanced integrated load management integrating isolated, insulated thermal mass, steel roof under-venting, climate specific windows, advanced fresh air management and advanced home energy management. The bones of this home are intended to leverage resources in a way that will require new approaches to modeling, to capture the reduced and moderated loads benefits we intend in this home. But mostly, I hope this home demonstrates to all of our partners a broader value proposition that promotes a more comprehensive understanding and pursuit of responsible source utilization for a world that desperately needs it.”

C.R. Herro, VP Innovation at Meritage Homes and homeowner

SPONSORS IN THE SPOTLIGHT

Here is a list of the sponsors who have made this project possible. As the year progresses, watch for detailed coverage of their products and contributions to the house.

WHIRLPOOL <i>KitchenAid</i> appliances	WESTERN WINDOWS	PREMIER SIPS structural insulated panels (SIPs) for roof
CONTROL4 whole-home control system	BORAL ROOFING stone-coated steel roofing	NUDURA insulating concrete form (ICF) for walls
PANASONIC <i>Cosmos</i> , vent fans	CULTURED STONE (also a Boral company) manufactured stone for interior and exterior (part of thermal mass story for fireplace)	SQUARE D electrical system
PANASONIC SOLAR PV + storage	SCHOTT fireplace glass	MOISTURESHIELD composite decking
UPONOR radiant heat, fire protection, <i>Phyn</i>		

"We're excited to be the automation partner for this VISION House". The Control4 Smart Home OS provides a great opportunity to improve efficiencies around the home to live a more sustainable life through intelligent lighting, shades, thermostats and more. By allowing various devices and products to be managed under one smart home operating system, the house can automatically react according to the time of day, temperature or changing seasons, giving homeowners yet another way to maximize green living and reduce their carbon footprint."

Earnest Morgan, Sr. Director of Business Partner Programs, Control4

"It's incredibly rewarding to work on a passion project like this one, which utilizes new products and techniques from today's most innovative companies in a way that can be replicated at a large scale. Our team is excited to partner with C.R. Herro, his team and the other category-leading brands to create something that is both sustainable and attainable for the future."

Ramsay Hawfield, Vice President of Marketing, Cultured Stone

"Whirlpool is very excited to partner with *Green Builder* and C.R. Herro to be part of the VISION House® of the future. The technology in this house makes it possible to have gorgeous and functional *KitchenAid* product in the kitchen and *Smart Whirlpool* laundry, without sacrificing energy use."

Kelly Safis, General Manager, Builder Sales, Whirlpool

"I am really excited about the fact that a sustainable and efficient home can be built at an affordable price. Typically, sustainability and affordability don't go hand in hand, and showing that the two values can be delivered to a homebuyer will definitely force other builders and designers to rethink their current model. Additionally, we recently launched *Wiser Energy—a Fitbit* for the home—that tracks real-time energy consumption and production. Our ability to demonstrate energy savings over time and see how this home compares to other homes will be a key factor in the overall success of the project."

Ansul Rajgharia, Business Development Manager, Schneider Electric

"We feel that *MoistureShield Vision*, a capped composite decking with excellent moisture resistance, is perfect for the VISION House® Seattle Cascades house and Seattle climate. The *Vision* line also features our innovative *CoolDeck* technology to reduce deck surface temperatures up to 35 percent. And, *MoistureShield* is made from 95 percent recycled content, both plastic and reclaimed wood, so it fits right into the green home narrative."

Josh Landis, Product Manager, MoistureShield, a division of Oldcastle APG



It's a living (room). The sleek aesthetic reflects the contemporary style of Pacific Northwest, with clean lines, mixed materials and large windows. The home boasts stunning design details, an open floor plan and innovative materials.

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and time to manage the learning curve," laments Herro. "We're trying to do something progressive and different with this project, and being on the leading edge can be challenging. We want to develop a case study so that other people—including building professionals, homeowners, permitting entities, municipalities, realtors, appraisers and lenders—can feel safe following suit and moving forward with the types of products and systems we're using. We're trying to normalize advanced green building and design practices. That has been both a burden and a joy, but I'm grateful for the ability to participate."

GIVING TO GET

With its high-performance building envelope systems, efficient mechanical systems, self-optimizing smart technologies and sustainable design features, the VISION House® Seattle Cascades will showcase how an upfront investment in efficiency will yield thousands of dollars in annual operating savings without any sacrifice.

"This is of paramount importance," says green builder and building science expert Ted Clifton, "because we need to help homeowners understand the true value of their home investment. What is the rate of return in reducing operating costs versus other types of investment? Does an investment

in efficiency outperform what you'd get in the stock market?"

In addition to exploring the true value of home investment, *Green Builder* will also debunk the price per square foot and lowest upfront cost valuation metrics that have been paralyzing the building industry for far too long. "These metrics are no longer valid, and they are wholly insufficient for measuring quality, performance, resilience and environmental impact," says Green Builder® Media CEO Sara Gutterman.

Stay tuned for frequent updates, articles, and videos on this ground-breaking project on the pages of this magazine, as well as on the [project's website](#). **GB**

Reaching New Horizons

Really homegrown.

New Horizons apartments include an on-site community garden to provide residents with access to fresh, locally grown produce.

Actively addressing Orlando's lack of affordable housing, a new 58-unit project sets out to prove that affordability and sustainability can co-exist.



On the Horizon(s). The New Horizons project includes a 52-kW rooftop solar array to lower utility bills for each apartment unit and reduce its environmental footprint.

BY BARBARA HORWITZ-BENNETT

RANKING THIRD NATIONALLY in lack of housing for extremely low-income residents, Metro Orlando offers only 18 rentals for every 100 families in deep poverty, according to a recent National Low Income Housing Coalition study.

Looking to rectify this, the Village of Orlando, Inc. and City of Orlando have rehabilitated close to 200 units, including a new 58-unit sustainable rehabilitation of an existing apartment complex—New Horizons—in the city's Washington Shores district.

But what's unique about this project is its quest to prove that affordability and sustainability can co-exist. As such, the New Horizons project showcases a number of green technologies, most notably a 52-kW rooftop solar array, providing close to 1 kW per resident.

"The New Horizons project is expected to serve as a demonstration to developers and the community that affordable housing and green initiatives—including solar, edible gardening, waste recycling and general energy reduction efforts—can be done where all stakeholders can benefit," reports Charles A. Rowe, development director for the Village of Orlando, Inc.

Chris Castro, director of sustainability for the City of Orlando, agrees. "The New Horizons project presents a showcase model for how low-income housing could incorporate sustainability features within the same project budget in an effort to lower monthly expenses, reduce environmental impacts, and enhance the quality of life for the residents," he says.

PROMINENT PARTS

In addition to aforementioned features, the units include ductless HVAC systems, high-efficiency water heaters, ENERGY STAR appliances, R-19/R-30 insulation values, low-flow fixtures and faucets, LED lighting, Florida-native landscaping, a community garden and rain barrels.

The ductless HVAC systems are a three-head wall-mounted mini-split arrangement in each bedroom and living room. "This allows the occupant to compartmentalize the systems efforts, which affords the user to manage consumption by focusing usage in areas of the home, based on need," explains Rowe.

These high-efficiency units are rated at 14 SEER, incorporate programmable thermostat in each unit, which provide modes for

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Priced right. Among the first of 20 affordable single-family residences is this house model in Orlando's Parramore community, which comes complete with sustainable products, such as energy-efficient appliances, low-flow water fixtures and hookup for solar arrays.



Indoor efficiency. The Parramore homes include energy-efficient windows, appliances and LED light fixtures.

dehumidifying, fan, heat and cooling.

In terms of the building enclosure, the project is a slab-on-grade concrete block structure with block construction for the interior wall partitions. Utilizing core injection methodology, insulation is injected into the concrete block voids to achieve those above-code R-19/R-30 insulation levels. For the attic spaces, blow insulation was utilized to boost performance and exceed the code.

The upshot is "improved indoor comfort of the units, more of a sound barrier between units, and better climate control to maximize energy efficiency," reports Castro.

Addressing water efficiency, the low-flow fixtures and faucets' reduction of water consumption is yielding as much as 50 percent savings on water bills.

As for the PV system, three rooftop panels are working to produce close to 100,000 kWh per year, which means up to a 40 percent reduction and a \$20 saving in monthly energy bills.

THE BIG PICTURE

Also serving as an example of urban renewal, this particular site was formerly abandoned, derelict and surrounded by barbed wire on a well-traveled street corner, essentially projecting an image of despair and isolation. Now, by turning the site into a new, sustainable housing complex, the community has received a boost of morale.

"We hope this project sets a precedent for the type of affordable and sustainable housing standards that other develops build to," adds Castro.

Granted, New Horizons is not the only affordable housing initiative in town.

In the lower-income Parramore neighborhood just west of downtown, the City is building 20 new single-family residential homes. Available at below-market rates, the homes are incorporating sustainable features, such as locally sourced building materials, sustainable



New and improved. A sustainable rehabilitation of an existing 58-unit apartment complex in Orlando's Washington Shores district is making affordable housing available to more Florida residents.

materials promoting good IAQ, energy-efficient appliances, low-flow water fixtures and possibly solar arrays.

Another City enterprise is its Property Assessed Clean Energy program, which gave \$1.5 million in loans to approximately 80 projects for clean energy home improvement in 2017 and is making \$5 million available to City of Orlando businesses and residents this year, with favorable rates and terms for low-moderate income households.

Similarly, the City's Solar Energy Loan Fund (SELF) offers favorable financing to low- and moderate-income families, helping to address that cost barrier for investing in solar.

SOLAR AND MORE SOLAR

Actually, the SELF project is one of several solar programs which earned the City of Orlando a SolSmart GOLD distinction from the U.S. Department of Energy in 2018, for its efforts to support and encourage city-wide solar projects.

By streamlining the solar permitting process; training planning, permitting and inspectors on the solar process; and creating new Solar Permit guidelines, this is effectively reducing the soft costs of going solar and making the process much easier.

Another solar initiative is a bulk purchasing aggregation program run by the Orlando Utilities Commission (OUC). By joining together with other homeowners in OUC territory, residential solar

installation costs are reduced by 20 percent to 30 percent.

The purchasing program is similar to buying in bulk at Costco, as opposed to your local grocery store, Castro explains. This buying power helps achieve an economy of sale that is much more cost effective. In particular, homeowners are reducing their \$3.50 per watt installed costs to \$2.40 per watt installed. "This is substantial, amounting to \$5,000 to \$7,000 savings," he reports.

At this point, there are currently 30 such co-ops in the State—and to Castro's knowledge, Florida is the only state with a utility offering such a program.

Another OUC initiative is Community Solar, which has made 20-plus MW of solar available to residents and homeowners who are interested in photovoltaics, but don't have suitable rooftop access to build their own systems. This way, up to 100 percent of their home's electrical bills can be offset with solar.

AFFORDABLE HOUSING PRIORITY

Tying things back to the issue of affordable housing, the City's focus is very much on projects like New Horizons and Parramore to ultimately provide more affordable housing options for Orlando residents.

"In the face of a rising need for safe, decent and affordable rental housing, we continue to search for ways and means to expand the community's stock of attainable units," Rowe says. **GB**

IoT THE INTERNET OF THINGS



COURTESY OF SAMSUNG'S CHEF COLLECTION

SMART APPLIANCES COME OF AGE: Selling Timesaving Tech to Busy Buyers

Connected home technology, used properly, can save time for what really matters.

BY MATT POWER

CONNECTED APPLIANCES HAVE MATURED in recent years. No longer pitched as simply a way to control your oven on your way home from work, their value as potential time and labor reducers has entered the conversation. That's smart. Saving time is the Holy Grail of almost any new technology today. But to convincingly make the argument that technology will save time, you have to factor in human behavior and include that variable as part of the consumer's education. Tech can take on common chores, yes, but only if used thoughtfully—a fact that many [fail to acknowledge](#).

For example, just because an automobile moves us from Point A to Point B faster doesn't mean it is "saving" us time. Chances are, if we had to ride in a horse and buggy the same distance, we would make the commute a lot less frequently, and spend fewer hours overall on the road. The same is true of washing clothes. If we're repeatedly loading and unloading washers and dryers all week, our Victorian ancestors who washed only on Tuesdays have us beat.

Key, then, is putting our connected devices in their proper place in our lives. For example, [an intuitive washer that alerts a user by smartphone](#) when a load of wash is sitting damp in the machine saves the time of running another load later than planned.

The real "quantum shift" in smart home tech is underway—a move from the foreground to the background of our lives. As connected tech in the home evolves from novelty to invisible helper, the brands and products that flourish will genuinely free up time for things people actually care about.

MINUTES TO SPARE

What do most Americans do all day? The data doesn't tend to vary much from a 2016 [Wall Street Journal survey on the topic](#). Those who are employed work about eight hours a day, sleep about nine hours a day, [watch TV for seven hours and 50 minutes daily](#), and squeeze in housework, childcare and other household activities around that "big three."

Presumably, they're doing all of those things with the TV, or YouTube, or Netflix blaring in the background. If you doubt that TV-watching statistic, keep in mind that most North Americans spend an astounding [90 percent of their lives indoors](#).

So where does connected living enter this picture? In the background, naturally.

To illustrate, let's look at time management in a connected kitchen. Kitchens are home to three time-consuming tasks: meal planning, grocery shopping and meal preparation/cooking. But the right technology can shave precious minutes from these mundane tasks, better used to buy back time for playing with children, calling a distant parent, meditating or going for bike ride. Here's how:

MEAL PLANNING. Americans eat the fastest of most industrial nations, and studies have shown that the less time they spend on meal planning, the more [fast food and low-quality food they consume](#). But does it have to be this way? Not necessarily. Many timesaving apps, such as [Mealime](#) and [Big Oven](#), offer a free assist for planning and purchasing meals. The better ones also account for vegetarian, vegan and other special diets.

Of course, another impromptu phase of meal planning involves leftovers. Dealing with partially consumed dishes also matters in the big picture. It's key to reducing the [huge food-waste footprint](#)



COURTESY OF SAMSUNG'S CHEF COLLECTION

Stocked. A key timesaver in the kitchen is the ability to re-order via connected appliances like this Samsung fridge, and to make more-efficient use of leftovers.

of Americans. This is where connected appliances enter the picture. For example, some smart refrigerators [now contain recipe planners](#) that take into account what's actually inside the fridge, including age and expiration dates. Some even offer recipe suggestions. Food saved. Time saved. Money saved.

ONLINE SHOPPING. Surveys show that most Americans dislike grocery shopping. It's a necessary evil, not a fun outing. And most people spend a lot of time doing it. For example, [the Time Use Institute](#)



COURTESY OF WALMART

Breaking and Delivering?

Walmart recently launched a new service where it sends an employee to personally restock your refrigerator, even while you're away. Workers access the house via electronic locks. The verdict on whether people will feel comfortable with this level of interaction remains to be seen.

notes that the average shopping trip takes 41 minutes. If you multiply that by the 1.5-trip-per-week average, that's more than 53 hours per year you're spending in the grocery store. To put that in perspective, [studies](#) suggest that American families only spend about 37 minutes of "quality time" together per day. So when they do shop, they spend more time at the store than they do with family on a typical day.

It's no wonder that, that after several years on the decline, online shopping for groceries is coming back, albeit selectively. It's a market with clear appeal to those short on time. As [Supermarket News reports](#), "services like Peapod, Instacart, Shipt and AmazonFresh that cut out the trip to the grocery store appeal mainly to those short on time: parents with children younger than age 18, and employed adults." The article also notes that higher-income Americans are bigger adopters of grocery delivery, either because higher income means they can afford more groceries, or they have greater access to mobile technology—such as smartphones and tablets—that make ordering online easier.

TIME SAVER. Into this growing market come connected devices—especially refrigerators—with built-in barcode scanners, smart screens, interior cameras and more. These appliances streamline the shopping process saving time driving, shopping and re-filling regularly used items.

COOKING WITH SPEED

Americans spend about 37 minutes daily preparing and cooking meals, not including shopping. We all know that certain devices, such as microwaves, can quickly warm up food or liquids. But no one wants to eat every meal out of a microwave. When it comes to cooking family meals, how do you take back minutes, yet still cook delicious, healthy meals?

For cooktops, an easy way to do this is with induction technology. I've cooked on an induction top for years. It's lightning fast for basic tasks, such as boiling water or simmering a stir-fry, and creates a hot griddle almost instantly with cast iron. Why spend 10 minutes waiting for water to boil or an egg to fry when you can do it in two?

Ovens can also be a big-time bottleneck. If the cook has to wait for one oven dish to complete before cooking a second one in a single oven, that's too slow.

One way to address this is with double ovens. But new technology allows you to cook multiple smaller dishes within a single oven. For example, [one Samsung model](#) has two separate oven compartments in one, each of which can operate at a different temperature, saving up to 45 minutes in total meal prep time.

THE FIX IS IN (THE BACKGROUND)

Another quiet, often unsung innovation in connected equipment is self-diagnosis. Consider that the new normal for troubleshooting household appliances is to purchase an extended care plan. But for appliances, the value of these plans depends largely on the ability to remotely diagnose a piece of equipment. Appliances typically are heavy, and repairing them off site could mean a major headache. Scheduling a home visit with a repair expert makes more sense,

but even the best service eats away valuable minutes of the day. Scheduling the visit takes time, as does the actual repair. By knowing what parts and labor will be needed before arriving, technicians can streamline their work. For example, [one Samsung model](#) comes with an app that helps you understand and translate an error reading, so you can tell a repair person what's wrong.

TIMELY TAKEAWAY

When you add up (or deduct) some of the time saved with the innovative and connected appliances described earlier, you can see how the right technology can earn its keep in modern homes, especially in the kitchen. Even if the dividend is just a couple of hours each working week, that's 24 minutes per day that homeowners can spend with family, pursuing a hobby or just staring into space (new parents, you can appreciate that last one). Many companies offer complete suites of connected products. It's now possible to leave some of the heavy lifting in the background, while saving water, power and time. What's not to like? **GB**

Privacy Plateau?

As home technology becomes normalized, buyer expectations about privacy have also adjusted.

RESearch shows that perceptions of privacy, across all demographic groups, are not as simple as headlines paint them. That's because most technology-minded consumers make many assumptions. They assume that basic levels of privacy will be maintained, and they accept that using technology will incur certain privacy risks. This varies somewhat by age cohort, of course.

Younger generations naturally feel the most at ease with almost any degree of data sharing. They've grown up with it. This is why millennials and "Generation Z" are often seen as the easiest upsell for every new technology.

But older generations, with their high levels of discretionary income, should not be written off. They're far from "anti" technology. In an interesting twist on the privacy discussion, [research from the Pew Research Center](#) found that trust in technology may be low, even declining, but that does not mean it will be rejected. People have reached a plateau where they may simply accept that there are certain privacy and security risks inherent with technology—a "cost of doing business," if you will.

What does this mean to manufacturers? Simply that they may have a little breathing room to tighten their privacy protocols now, without having to backpedal too much on product releases. As long as consumers trust that privacy is improving across the board, they're less likely to throw up their hands and reject connected technology outright.

YOUR HOME SIMPLIFIED



Life gets busy—but when your home technology is connected into one simple-to-use system, it helps take away some of those daily little stresses. A true smart home makes your life more convenient and your home safer, more comfortable, energy efficient, and easy to enjoy.

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IAQ: Breathe Easier

Products, Research and Advice for Improving Indoor Air Quality

The New Dorm Norm

As architects rethink college constructs, residence halls are getting healthier.

BY JAVIER ESTEBAN

IN 1984, THE WORLD HEALTH ORGANIZATION suggested that up to 30 percent of new and renovated buildings had excessive complaints related to indoor air quality, which was directly related to Sick Building Syndrome. According to the U.S. Environmental Protection Agency (EPA), this “disorder” describes situations in which building occupants experience acute health and comfort effects that appear to be linked to time spent in a building, but no specific illness or cause can be identified.

While we still see cases of Sick Building Syndrome today, we have certainly come a long way from the less healthy buildings of the 1980s. Today, designers are focused more than ever on specifying and constructing healthy buildings, including residence halls.

To put into perspective the importance of this issue: According to the EPA, the average American spends up to 87 percent of their time indoors, inside buildings. Everyone lives and breathes in man-made spaces with a certain amount of filtered fresh air, surrounded by products with high levels of chemicals. That’s certainly true of residence halls.

So, what is a healthy building—or more specifically—what constitutes a healthy residence hall?

There are many definitions, but in general, a healthy residence hall is architecturally designed to promote physical activity and healthy habits, while using healthy materials and building systems to provide a healthy environment.

Getting going with some get-up-and-go among students

Buildings can promote student physical activity through spaces that encourage exercise, such as a prominently located main staircase. By creating a wide and welcoming staircase with lots of natural light where students can also hang out (commonly called the “community stair”), students will often use it for at least the first three floors.

Another strategy is locating elevators in a secondary place behind the staircase, to encourage students to use the stairs. Special consideration must be taken to not to segregate students who are in wheelchairs or visually impaired.

The Active Design Guidelines published by New York’s departments of Design and Construction, Health and Mental Hygiene, Transportation, and City Planning includes multiple strategies that can be used for site planning, as well as the exterior and interior of a building to promote exercise. This is especially important in the context of a “mini city” such as a university campus, where means of transportation include bicycles, skateboards and electric scooters, in



Lobbying for change. Creating a wide and welcoming staircase with lots of natural light gives students a place to hang out, and encourages exercise from using the stairs instead of an elevator.

addition to the traditional campus bus. The opportunities to create an active campus are infinite, but it requires the common vision of all stakeholders.

Integrated building signage can be used not only as a wayfinding tool, but also as motivation and information about healthy habits. For example, signage can inform students how many calories they burn by climbing one flight of stairs, while small signs can provide mile markers on campus walks.

This interrelates with promoting healthy habits. Research shows that creating additional vistas to the landscape and active spaces motivates people to move.

Color and lighting are also very important in setting the “mood” of the building. Lively colors induce movement, together with living walls thriving with vegetation; all are part of the concept of *biophilia*—an innate tendency in humans to seek connections with nature and other forms of life. The intent with these initiatives is not necessarily for students to start exercising in the building, but rather to make the users more active in their daily routines by, using

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The great indoors. A life-friendly residence hall, such as Saints Residence at Maryville University in Saint Louis, promotes physical activity and healthy habits by being designed with green materials and building systems.



what behavioral economists call “nudging,” or small pushes toward changing behavior.

Next, furniture selection is integral to the built environment. It is very important in residence halls to have variation in the furniture, tables and chairs, soft seating, etc. This also includes active furniture spread out in small meeting rooms, study rooms and lounges—all to create a more dynamic and active residence hall.

Sometimes the message is a lot more direct. For example, at North Residence Hall at Indiana University–Purdue University Indianapolis (IUPUI), KWK Architects designed a very open fitness room integrated with the floor that not only blends with the social functions of that community, but also takes advantage of expansive views of downtown Indianapolis. The design and location of the room also allows other floor residents to go to the top floor and get exercise in a relatively private manner.

Specifying healthy materials

The use of healthy materials is very important in the construction of any residence hall, and it starts from day one—understanding which materials will be selected for the design. Consumers are used to seeing ingredient labels on the foods they purchase and eat every day, so why not start doing the same thing for a building that students will spend most of their time in on campus?

“The average American spends up to 87 percent of their time indoors, breathing filtered fresh air, surrounded by products with high levels of chemicals.”

There are three major systems in place that help create an inventory and screening of the major components of building materials that students are surrounded by—Health Product Declaration (HPD), Cradle-to-Cradle Products and Red List Products. All three systems are used to identify and ensure compliance with LEED or Living Building Challenge requirements, and help designers select materials that contain minimum amounts of (or are void of) harmful materials. This requires conversations with construction product manufacturers, as it happened several years ago with the push for more recycled content



Smart snacking. Indoor amenities can be designed to be a welcome environment for residents, such as with vending machines stocked with healthy snacks, water refill stations and well-lit, expansive prep areas.

COURTESY OF KWK ARCHITECTS

or the substantial reduction in VOCs (volatile organic compounds) in paints, glues and sealants. Of special importance are the LEED v4 requirements, which have encouraged manufacturers to publish HPDs on many construction products.

More and more materials used in building interiors today include sustainable, recycled materials, such as countertops made from recycled plastic waste and carpet nylon made from recycled fishing nets harvested in the Philippines and Central Africa.

Even the mechanical and plumbing systems can be designed to ensure clean fresh air, reduction of pollution and adequate air filtering—not only at the building level, but also at the source of the chilled water or steam in cases of power plants and campus loops, very common in the context of the university campus.

Including filtered drinking water fountains in strategic locations instead of soda vending machines can help promote an overall healthier environment for students. Traditional water fountains

are also being replaced by water bottle refill stations. Additionally, vending machines can sell healthy snacks and beverages.

One of the established paths to achieving a healthy building is to incorporate a WELL building standard (Silver, Gold or Platinum) composed of seven concepts: air, water, nourishment, light, fitness, comfort and mind. The goal is to advance health and well-being in buildings.

There is clear synergy between active and sustainable buildings: They both encourage and promote a healthy environment outside and inside buildings. **GB**

Javier Esteban is a KWK Architects principal. Founded in 2013 by five architects with a combined 150 years of higher education knowledge and experience, KWK Architects partners with colleges and universities across the United States to create innovative and inspiring places that enhance campus life.

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Getting Going and Going Pro With Your Payment Strategy

With minimal effort, builders can keep track of money flowing in and out the door.

BY BRENT MEYERS

I'VE WRITTEN ABOUT the importance of a vendor payments strategy for companies in today's business climate. But the reality is it's twice as imperative for construction companies to implement this process, because the industry's payment challenges are bigger—and so is the opportunity. Payments are at the center of two critical areas of the construction business: vendor relationships and job progress. So, getting strategic about how you pay can make a big impact.

What exactly is a payments strategy? In the check-centered world of the past, it meant managing float, capturing early-pay discounts, and/or shifting some payments to credit card in order to get rebates. Today, it means using intelligent automation to get the most leverage from every payment you make.

Beyond replacing checks

It starts with eliminating paper checks—but it doesn't end there. You have to think strategically about how you're going to replace them.

First, encourage as many vendors as possible to take virtual card payments. Designed specifically for accounts payable (AP), virtual cards offer the convenience and rebates of credit cards, along with an extra level of security.

Any vendors who won't accept credit cards should be signed up for ACH payments. After that, only holdouts who absolutely won't take any form of electronic payment should get a paper check.

Sounds easy, right? It's not, for two reasons—workflow and vendor enablement.

Workflow changes can mean extra work

For years, businesses have tried to eliminate paper checks, with only



Paper champion? With the transition to a cloud-based payment system, money isn't what it used to be.

moderate success. Simply adding a card product or bank-provided ACH hasn't gotten them across the finish line, because those solutions only move money electronically. They don't help reduce the necessary front-end work to get to the point of payment. Ironically, introducing payment types like card and ACH solutions on their own can actually add more workflows and complexity to the process.

A complicated process is one reason construction companies are still mostly check-based. They're already managing lien releases, progress payments and job-cost accounting on top of the usual AP process. Adding more

workflows for electronic payments is the last thing they need.

The vendor enablement challenge

The other factor that's kept businesses from going electronic is the task of vendor enablement. All you need to pay any vendor by check is their name and address. But electronic payments require you to know who will accept a card or ACH—and getting that information is a lot of work.

Besides that, in order to pay vendors who agree to accept ACH, you need to collect, securely store and maintain their banking information. Most AP departments don't have the resources to add comprehensive, ongoing vendor enablement and data security to their workload.

Construction companies face even bigger vendor-enablement challenges. Every job is almost like a mini-company, with different owners and different business entities, localized vendors, and an ever-changing roster of local and specialty subcontractors. I've sold AP solutions for over a decade, and have never seen an industry with as much payment complexity as construction.

At the same time, construction also faces low profit margins and



Filling (out) the bill. When it comes to balancing the books, construction companies are among the most complex entities, due to their many vendors and ever-changing roster of subcontractors.

scarce IT resources, and sees fit to spend most technology investment on field operations. Further, with many construction companies run by founding families, the tradition of the owner signing every check dies hard.

Not just for consumers

Here's the good news: Just as they did with consumer payments, technology companies have stepped up to go beyond moving money electronically. Automated payment solutions enable you to make every type of payment from a single interface. There's just one workflow: deciding which invoices to pay and clicking the "pay" button.

You don't even have to know how a vendor wants to get paid. Solution providers now use cloud-based networks to handle vendor enablement and information management at scale—and a lot of your vendors are probably already part of their networks. Plus, the cloud lets providers integrate their solutions into your enterprise resource planning (ERP) or accounting system with just a few hours of IT time. These new fintech systems can help most businesses reach 80 percent or more electronic payments. It's a project that pays for itself quickly and frees up AP time for other initiatives.

Early electronic-payment adopters in construction have found that being able to pay vendors on time consistently with full remittance data helps them attract top subcontractors to bid on their jobs. They can also enable field supervisors to approve payments in the cloud

while on their jobsites, which saves tons of time and really helps keep jobs moving.

Positioning for the future

Although construction lags other industries in adopting technology, in general, it's not far behind in terms of payment automation. Many companies are slow to adopt electronic payments, because they're simply unaware of new automation solutions. For years, bank and card products have been the only game in town, even though they haven't solved for all the complexity surrounding payments. Things have changed, and there's a lot coming down the pike, including innovations in accounts receivable (AR), trade finance and dynamic discounting.

As payments become automated in the cloud, companies are gaining enough visibility and speed in invoicing and payments to leverage these advanced programs. Even if you're still heavy into checks, you're not a long way from being able to capitalize on new technology solutions.

So, it's time to start thinking strategically about payments—not just as paying bills or shifting from paper to electronic. Think about payments as an area where you can leverage technology to increase value and get out on the leading edge of back-office innovation. **GB**

*Brent Meyers is the vice president of national sales for **Nvoicepay**. He specializes in regulation compliance and expense reporting solutions for the accounts payable industry.*

Four IECC-R Proposals to Track in 2019

Keep an eye on these possible compliance actions heading your way in the near future.

BY MIKE COLLIGNON

THE INTERNATIONAL ENERGY CONSERVATION CODE (IECC) Group B code hearings were held in Albuquerque, N.M., from April 28 to May 8. While there were a number of codes being considered during this 11-day stretch, the IECC is arguably the “star” of this set of codes. There were hundreds of code change proposals filed; some familiar, some new. Rather than rehash all that transpired over the six days that the IECC-R was heard, we’re going to highlight the outcomes of a few significant proposals.

[NOTE: In the context of this article, “outcome” means the decision of the code committee, and is the first stage in a three-stage process. After the code committee makes its recommendation, the code change proposals and the respective recommendations are put out for public comment. Those comments will then be considered at a public comment hearing (PCH) in Clark County (Las Vegas), Nev., on Oct. 23-30. **Per the ICC:** “Following the PCH, the Online Governmental Consensus Voting (OGCV) period will start approximately two weeks after the conclusion of the PCH. The results of the PCH will be combined with the OGCV to determine the final disposition of the code change proposals that were considered at the PCH.”]

RE17-19

★ **PROPOSAL:** This would create a new compliance alternative in Section R407. Compliance would be determined using heating and cooling load analysis. Energy code compliance through this path would still need to meet the provisions identified in Sections R102.3, R403.5, R403.8, R403.9, R403.10, R403.11, and R404.1:

Equivalent HVAC building load. The ratio of the space cooling load and space heating load to conditioned floor area shall be less than or equal to the values in Table R407.3.

Air leakage and duct leakage testing would be retained in this proposed compliance path.

TABLE R407.3 (IRC N1107.3)
Cooling and heating load per square foot

Climate Zone	Cooling Load per Square Foot	Heating Load per Square Foot
0	10.1 Btuh	3.1 Btuh
1	8.9 Btuh	4.6 Btuh
2	11.6 Btuh	7.3 Btuh
3A and 3B	6.5 Btuh	8.5 Btuh
4A and 4B	7.6 Btuh	8.8 Btuh
3C	3.3 Btuh	5.8 Btuh
4C	6.0 Btuh	7.1 Btuh
5	7.0 Btuh	11.4 Btuh
6	5.5 Btuh	11.6 Btuh
7	4.9 Btuh	13.1 Btuh
8	4.0 Btuh	18.1 Btuh

★ **COMMITTEE ACTION:** Approved as Modified: “This is a clean and simple compliance path: It increases flexibility by adding another option, focuses not on materials but efficiency. The modifications clarified that the language applies to envelope load and it does not impact equipment efficiencies or lighting, corrected the citation, and added as mandatory the certificate (Vote: 6-5).”

★ **COMMENTARY:** Interestingly, there was an assembly motion to disapprove this proposal. However, the online vote after the hearing did not sustain that motion (by a 61 percent to 39 percent margin), so it remains approved as modified. This will be a proposal that will certainly garner a number of comments this summer, and will generate quite a bit of testimony in October.

RE27-19

★ **PROPOSAL:** This proposal would create a new compliance option for wood-frame wall insulation requirements. (The underlined content in the table equals proposed new language.)

This proposal looks to accomplish a few things:

1. Include an additional equivalent insulation option for cavity



Down to business. Revisions to insulation, heating and cooling regulations were among the key discussions at this year’s International Energy Conservation Code (IECC) Committee Action Hearings for Group B Codes.

Table R402.1.2 (IRC N1102.1.2)
Insulation and Fenestration Requirements by Component

Climate Zone	Wood-Frame Wall R-Value
1	13 or 0+10 ^h
2	13 or 0+10 ^h
3	20 or 13+5 ^h or 0+15 ^h
4 except Marine	20 or 13+5 ^h or 0+15 ^h
5 and Marine 4	20 or 13+5 ^h or 0+15 ^h
6	30 or 20+5 ^h or 13+10 ^h or 0+20 ^h
7 and 8	30 or 20+5 ^h or 13+10 ^h or 0+20 ^h

^h The first value is cavity insulation, the second value is continuous insulation. For example, “13+5” means R-13 cavity insulation plus R-5 continuous insulation.

- insulation, because in the 2018 IECC, an equivalent cavity insulation-only option is missing in Climate Zones 6-8.
2. Provide for equivalent continuous insulation-only options, which are also missing.
 3. Provide the table with a simple-yet-complete set of insulation options for location of insulation on wood-frame wall assemblies for each climate zone, which would improve the usefulness

of prescriptive options and show the full range of equivalent insulation options (e.g., cavity only, hybrid cavity + continuous, and continuous only).

4. Address concerns that the prescriptive table favors certain options over others by excluding viable options in some climate zones.
5. Provides more flexibility to coordinate insulation options with vapor retarder provisions in the building code, which vary by climate as well as insulation strategy. The proposed flexibility gives users more choice between insulation options that provide equivalent assembly U-factor (as a minimum requirement of the energy code), yet have different capabilities and functions with respect to comfort, air tightness, moisture control, thermal bridging mitigation, and other factors that are important to an overall code-compliant wall assembly.

The **reason statement** for this proposal also contains a number of calculation spreadsheets for the different insulation levels/respective climate zones.

★ **COMMITTEE ACTION:** Approved as Submitted: “This provides additional options for compliance. It simplifies code language and encourages users to look at all the associated issues (Vote: 8-3).”

★ **COMMENTARY:** If for no other reason than the 8-3 committee vote, this will probably have comments filed. However, it seems to have positive momentum heading into October’s hearing.

RE223-19 (APPENDIX RB)

★ **PROPOSAL:** This proposal would create a new appendix for zero-energy residential buildings. This section, if adopted, would require the rated design to have a score less than or equal to the values

in Table RB103.2, when compared to the ERI reference design determined in accordance with RESNET/ICC301 for ERI values that include and do not include onsite power production.

The footnote in this table creates a prescriptive backstop of the 2015 IECC, which already exists in section R406 of the 2018 IECC. While the ERI numbers are notably lower than those in the body of the code, this is a zero-energy appendix.

Table RB103.2 (IRC AQ103.2)
Maximum Energy Rating Index^a

Climate Zone	Energy Rating Index Not Including Onsite Power	Energy Rating Index Including Onsite Power (As Proposed)
1	43	0
2	45	0
3	47	0
4	47	0
5	47	0
6	46	0
7	46	0
8	45	0

^a The building shall meet the mandatory requirements of Section R406.2, and the building thermal envelope shall be greater than or equal to the levels of efficiency and SHGC in Table R402.1.2 or Table R402.1.4 of the 2015 International Energy Conservation Code.

A quick note on appendices: They are sections of building code language typically confined to a specific topic. Since these sections are not in the body of the model code, they are considered optional content that jurisdictions can choose to adopt if it is applicable. An example would be the appendix on tiny homes. Some jurisdictions have seen a rise in tiny home construction, so they have adopted that appendix to provide the local building community with code guidance. Other jurisdictions have not felt the need to adopt the tiny home appendix yet.

★ **COMMITTEE ACTION:** Disapproved. “It needs additional compliance language for buildings without solar. Does not offer guidance or flexibility; it needs the term “net” included in title, and the ERI numbers are too low (Vote: 6-5).”

★ **COMMENTARY:** Because of the near-split decision, as well as the guidance provided by the committee, this will likely have a handful of comments filed against it. It wouldn’t be surprising to see this proposal, or something like it, being added to the 2021 or the 2024 IECC. With so many cities and states committing to 100 percent renewable energy goals by 2030, 2040 or 2050, the ICC will need to provide a tool for their members (code officials) in those respective jurisdictions, preferably sooner than later.

In the reason statement, it is stated that this appendix’s guidance would result in a residential building that has zero energy consumption over the course of a year. That’s a little deceptive, because while that would most likely be true in years 1 and 2, as the

onsite power production system (probably PV) degrades over time (approximately 1 percent loss in productivity per year), the building will no longer be zero energy. It will still have a very small utility bill, but after 10 years, it will go from a zero-energy building to a roughly 10 percent energy building.

RE224-19 (PARTS I AND II; APPENDICES RB AND U)

★ **PROPOSAL (PART I):** This proposal is attempting to add stretch code provisions to the appendix of the IECC. To accomplish this, residential buildings or portions of residential buildings would need to look to the requirements of ASHRAE/IES Standard 90.2.

★ **COMMITTEE ACTION (PART I):** Disapproved: “If it is in an appendix, it takes a specific action by a jurisdiction. If it is an alternative path, it belongs there. Unclear if mandatory requirements are included. There is an unconfirmed potential conflict with the 2018 IECC and the potential unconfirmed comments on the 90.2 (Vote: 7-4).”

★ **PROPOSAL (PART II):** This proposal is attempting to add stretch code provisions to the appendix of the IRC. Since many of the provisions within the IECC-R and IRC Chapter 11 are consistent/overlapping, it is usually prudent for a code change proposal of this magnitude to cover both documents.

It was also noted in the reason statement that a stretch code that references ANSI/ASHRAE/IES Standard 90.2-2018 allows for a stretch code that is based on an ERI methodology compatible with the ERI pathway within the base IECC.

★ **COMMITTEE ACTION (PART II):** Disapproved: “Keeping in alignment with the decision for Part 1. If it is in an appendix, it takes a specific action by a jurisdiction. If it’s an alternative path, it belongs there. Unclear if mandatory requirements included. There is an unconfirmed potential conflict with the 2018 IECC and the potential unconfirmed comments on the 90.2 (Vote: 7-4).”

★ **COMMENTARY:** There are many ways to structure a stretch code. This was merely one approach. While rejected by the committee, the talented and intelligent people who work on codes will probably come up with a suitable alternative either this summer or during the next code development cycle.

The committee action on Part II is simply staying consistent with its action on Part I.

Public comments can be filed on any code change proposal, regardless of the committee’s recommendation. To do so, one would need to sign up or log in to [cdpACCESS](#) and file comment(s) by July 24, 2019. Registration is free and open to anyone. **GB**

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

COURTESY OF
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FROM THE TAILGATE

New Offerings for the Sustainable Minded

By Ron Jones

That ‘Ounce of Prevention’

WHEN YOU RESIDE at almost 9,000 feet above sea level, you don’t necessarily give local flooding a lot of thought. Flooding is something you see and hear about on the news coming from coastal regions and the farmlands in the Midwest. That changed for us here in the Colorado Rockies this summer, after we received roughly twice our normal snow accumulation over the winter. That tremendous snow load triggered massive avalanches here and in many other parts of the Mountain West, as they crashed down the slopes and chutes with incredible force.

They mowed down entire sections of forests, turned thousands of mature trees into shattered missiles, and then deposited them, along with trainloads of boulders, into gigantic debris piles held together by ice and packed snow. As a result, the pending snowmelt represents flooding threats in the creeks and rivers up in the high country on a scale rarely experienced over the decades. Our little village has been under flood warnings since the middle of spring and, as of this writing, the threat persists even though thousands of sandbags now line many of our buildings and roadways.

Several years ago, I had the opportunity to deliver a presentation on the same program as retired General Russel Honoré, the renowned military commander who was sent into New Orleans in the aftermath of Katrina to restore order and provide protection, assistance and hope to the citizens there. Honoré was a leader known for getting results and for providing colorful sound bites.

On the subject of floods he is quoted as declaring, “This is a disaster. This isn’t something somebody can control. We ain’t stuck on stupid.” Unfortunately, we may be. Many places experience the same series of catastrophes and disasters time after time, and yet we continue to build and rebuild in many of them.

The General said that he had previously declared that “recovery costs five times more than prevention,” but subsequent reports from the federal agencies responsible for dealing with such events showed him to be in error. The data from those studies indicated that the actual costs were tenfold or even more. Yet, the homebuilding and real estate development industries relentlessly lobby lawmakers to maintain their opportunities to harvest profits from risky projects in areas that are often marginally safe at best.

The old axiom, “an ounce of prevention is worth a pound of



cure,” famously attributed to Benjamin Franklin, is believed to have referred to fire prevention, but it can apply to many kinds of threats that result from a host of man-made and “natural” disasters. Sadly, the wisdom in his words often falls on deaf ears, when short-term economic opportunities are at stake.

Many of us have recognized that we are witnessing just the tip of the proverbial (melting) iceberg, when it comes to pending environmental challenges and the many disasters that are occurring with increased frequency and intensity. But collectively, our industry appears willing to pursue the business-as-usual model for as long as there are profits to be grabbed, regardless of how steep the odds are that history will continue to repeat itself, often in ways that are bad for everyone.

One more quote from General Honoré seems increasingly worth considering: “People need to be cautious, because anything built by man can be destroyed by Mother Nature.” **GB**

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