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PUSHING THROUGH

As COVID-19 takes its toll, building pros and product makers respond with cautious optimism.

INSIDE:

Seattle Cascades

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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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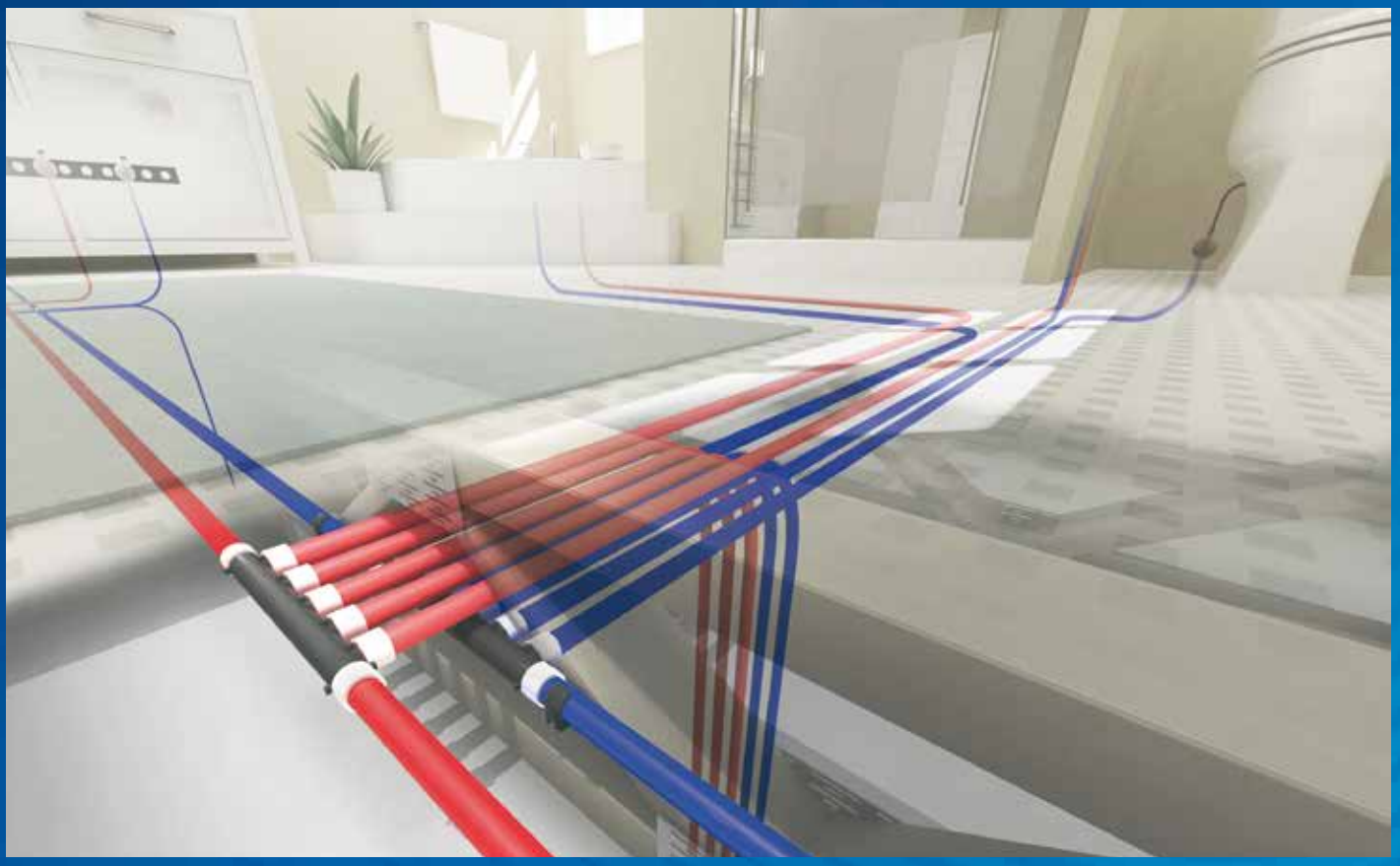

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EDITOR'S NOTE

The Inside Scoop

By Matt Power
Editor-in-Chief

Sell now. Build later.

A perfect storm of pandemic anxiety, nomadic obstacles and new family members could (still) spur a surge of online home buying among millennials.

WITH HOME MODEL TOURS and walkthroughs now off limits, it's not surprising that more people are shopping online for new digs. What may surprise you, however, is that millennials, who have been slower to embrace home ownership than their parents, may have turned a corner. They're ready to buy a home now, and many of them don't care if they have to do the whole thing online, without ever stepping foot in a physical building.

So-called "sight unseen" home purchasing, however, became a trend well before COVID-19 hit. As far back as 2017, *Redfin* found that home purchases with no physical sites visit accounted for about 35 percent nationwide, with 45 percent of millennials buying that way. Only 6 percent of baby boomers made their purchase without seeing the home in person.

One of the big obstacles to millennials purchasing homes has been their insistence on a "nomadic lifestyle" unfettered by the shackles of living in a single location. As parent of a globetrotting kid, I know this sentiment well. But as international borders close, AirBnb slashes its workforce, and backpacking in Indonesia becomes impossible, owning a home starts to look a lot better than shacking up in a family member's basement every few months to refuel—or placating a strict landlord.

The coronavirus may be the nudge that pushes millennials over the edge from looking to buying. Prices for housing at this writing remain high, and wages have stagnated. One question builders may have is whether they will buy if prices don't drop. Zillow predicted on May 12 that housing sales will see a 60 percent decline this year, but only a 3 percent price drop.

Just before COVID-19 hit, *realtor.com* noted that millennials now represent the largest living generation, and their priorities are shifting to "family friendly lifestyles and affording housing." They were ready to buy homes in urban and suburban walkable neighborhoods with fewer luxuries but more access to culture.

CREDIT: STATICNAT 1983/ISTOCK

Virtual quick draw. Millennials are more willing than ever to purchase a new or existing home online without ever stepping foot in the real thing. The only wild card: Will they have jobs?

The real number to watch now is employment. If millennial jobs survive what I would describe as the Russian-Roulette re-opening of the U.S. economy—and that's a big if—they'll each be looking aggressively for a home they can afford. And they'll be ready to close the deal online rapidly, sign the mortgage with an online notary, and move in without ever meeting the builder in person. **GB**

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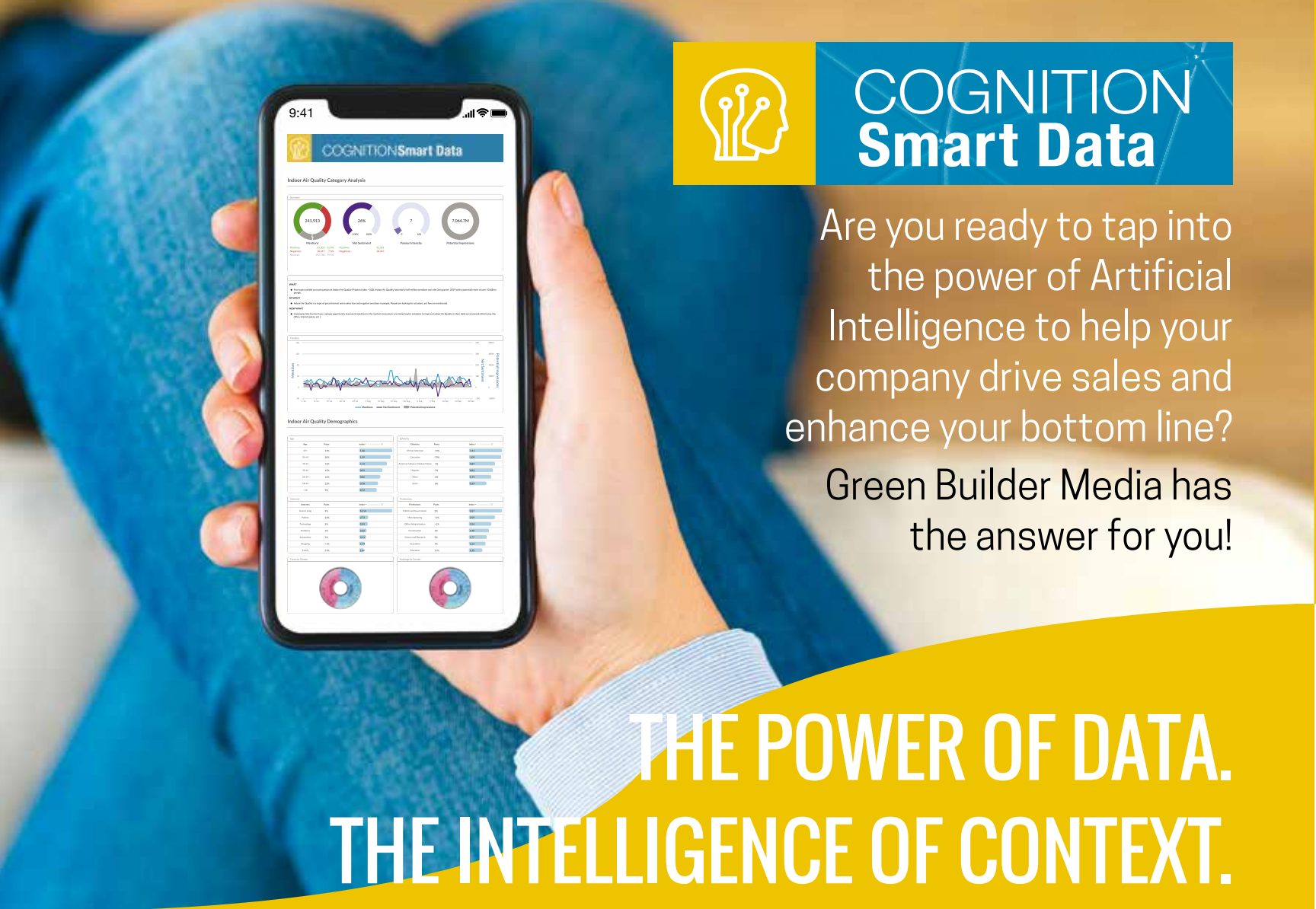

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Extreme Weather Expected This Summer

Half of this season's Atlantic storms may become hurricanes.

LEADING WEATHER EXPERTS predict above-normal probability for major hurricanes and storms making landfall in North America this hurricane season. Meteorologists from Colorado State University, one of the nation's top hurricane forecasters, predict 16 tropical storms will form, of which eight will become hurricanes. In an average season, there are 12 tropical storms, six of which are hurricanes. The dire predictions compound potential issues for homeowners already stressed and sheltering in place due to the coronavirus pandemic. Experts are urging homeowners and builders to proactively line up defenses and be ready for heightened storm activity, before the home improvement center and retailer rush that occurs when hurricane and tropical storm forecasts appear. "It's not uncommon to see images of neighborhoods that show mass destruction after a hurricane, and yet the homes that have been properly fortified are still standing," says Renee Ramey, executive director of the Metal Roofing Alliance (MRA). "It all starts with making the right decisions and choosing more resilient materials and installation processes right from the get-go." Other preparation steps include surveying the landscape for dangerous projectiles, having a certified building inspector or engineer examine the home, checking the home's insurance coverage and having an escape plan in place.

CREDIT: ALEXANDER GERST/FLICKR

Evil eye. This summer's hurricane season may be one of the worst ever. If so, a category 4 storm such as Hurricane Florence in 2018 may seem routine.

Pandemic Wreaking Havoc on Clean Energy Sector

Labor department warns that one-fourth of all green energy workers could be jobless by July.

MORE THAN 1 IN 6 PEOPLE in the green energy industry lost their jobs during the first six weeks of the coronavirus pandemic, according to data from the U.S. Department of Labor (DOL) released in mid-May. That data reveals that almost 600,000 clean energy workers filed for unemployment from mid-March to end of April. The industry's losses accounted for 2.5 percent of all jobless filings nationwide—26 million—during that time.

The stark numbers are a drastic turnaround from the industry's outlook at the beginning of the year. Clean energy had been one of the U.S. economy's biggest and fastest-growing employment sectors, growing 10.4 percent from 2015 to 3.4 million jobs at the end of 2019. Nearly three times as many people held clean industry jobs compared to the fossil fuel industry.

CREDIT: COURTNEYK/ISTOCK

Pandemic panic? An already battered green energy sector could be nearly decimated if current unemployment trends continue.

Now, a potential 850,000 green energy workers will be unemployed by end of June—roughly 1 in 4—unless the federal government takes action, DOL warns.

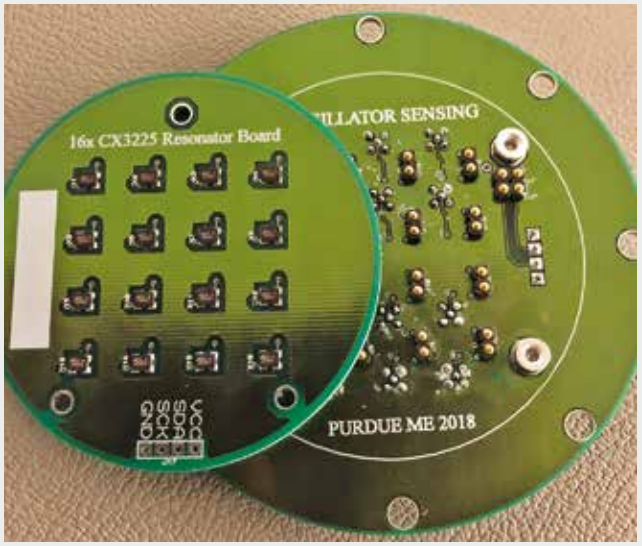
Most green job losses in April were in the energy efficiency sector, where 310,000 workers—about 70 percent of all sector jobs—filed for unemployment. Renewable energy came in a distant second: 71,800 unemployment filings, or about 13 percent of all sector jobs, according to DOL.

Sensor Measures CO_2 to Adjust HVAC

By applying a human-centric metric, cooling and heating can be optimized for the comfort of occupants.

PURDUE UNIVERSITY RESEARCHERS have developed a sensor to help control and cut down on energy consumption through heating and ventilation systems, particularly those used in large office and hospitality industry buildings. The lower-cost, lower energy-using carbon dioxide sensor could change the way energy heats, cools and ventilates large buildings and eventually homes, according to lead researcher Jeff Rhoads, a professor of mechanical engineering in Purdue's College of Engineering.

"Climate control and proper ventilation are especially important because most people spend considerably more time indoors than outside," Rhoads says. "Climate control and ventilation are also huge sources of energy consumption in the United States and around the world."

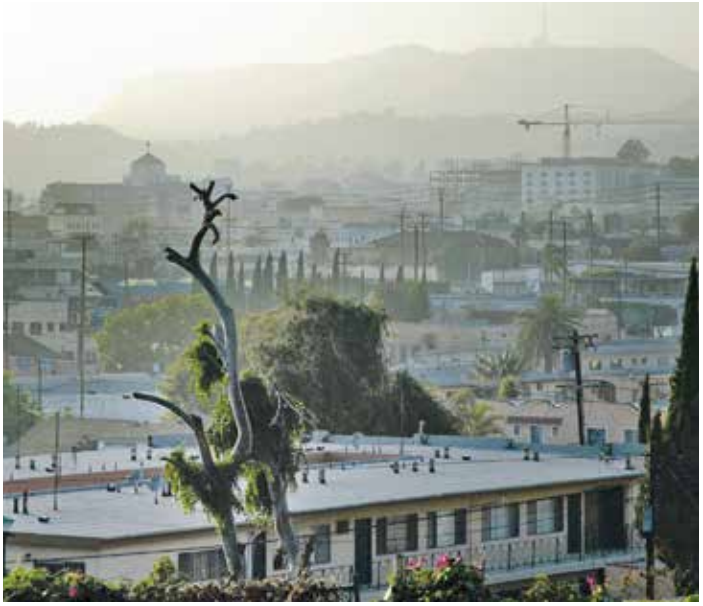


CREDIT: PURDUE UNIVERSITY

Breath count. Purdue University's new heating and ventilation system-based CO_2 sensor cuts indoor energy use by detecting how many people are breathing in a room, and therefore, how much energy the room might need.

The technology identifies when carbon dioxide is released into the air by a person, or people entering and breathing inside that space. The sensor detects the CO_2 level so that heating and ventilation systems can control the climate and air turnover in spaces that are occupied, instead of using energy to control rooms that are empty.

Rhoads adds that the Purdue sensor also helps address privacy concerns about using camera technology for detecting when someone enters and leaves a room. The researchers are also working to integrate the sensor with other Internet of Things building technology.



CREDIT: CLINTON STEEDS/FLICKR

Name your poison. On a typical day in many major cities, air quality is pretty bad. But two reports from medical researchers say the air inside homes can be a lot worse.

Study: COVID-19 Isn't the Only Risk to People Staying at Home

New medical report cites major air quality issues, courtesy of gas stoves.

PEOPLE KEPT INDOORS BY COVID-19-induced stay-at-home orders may have another airborne problem. According to a report by the Rocky Mountain Institute, Physicians for Social Responsibility (PSR), Mothers Out Front, and the Sierra Club

Gas, stoves are likely exposing tens of millions of people to levels of indoor air pollution that would be illegal under outdoor air quality standards.

The report, *Health Effects From Gas Stove Pollution,* notes that indoor air can be two to five times more polluted than the air outside. Homes with gas stoves have nitrogen dioxide concentrations 50 percent to 400 percent higher than homes with electric stoves. The findings mirror those in a report from the UCLA Fielding School of Public Health**,** which found that 90 percent of all California homes experienced levels of nitrogen dioxide (NO2) pollution that exceed state and national air quality standards within an hour of cooking on gas stoves.

"As health professionals, we are worried by this risk," states Barbara Gottlieb, environment and health director for PSR. "With so many of us seeking shelter in our homes from the COVID-19 crisis, it's urgent that we understand the threat and learn about protective measures we can take."

The respective reports are available at www.psr.org and www.ucla.edu.

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"The home building industry is like a large ship. It requires a great deal of force and distance to change directions." PAGE 19

ON THE COVER

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PUSHING THROUGH

Top building pros express cautious optimism as they adapt to virtual selling, online meetings and "sight unseen" buyers.

BY MATT POWER, EDITOR-IN-CHIEF,
WITH INTERVIEW CONTENT FROM RON JONES,
SARA GUTTERMAN, ALAN NADITZ AND CATI O'KEEFE
ADDITIONAL CONTENT FROM EEBA WEBINAR PANEL DISCUSSIONS

TO HEAR SOME OF THE NATION'S most-progressive and sophisticated builders talk about the COVID-19 economic meltdown is to take heart. The party's not over, as far as they're concerned—not even close.

Are they right? Do they know something their less successful peers do not? Yes, in all likelihood, they do.

That's because top tier builders are used to fighting for their economic lives. They've ridden out recessions, housing bubbles, market adjustments, housing moratoriums, code changes and more. They're not your run-of-the-mill small contractor, with a company lifespan of three years.

Our talks so far with the industry find that high-performance firms been proactive since the COVID-19 crisis first appeared. They didn't dawdle, the way government officials did.

"We immediately harkened back to prior crises," Gene Myers of Thrive Homes in Denver said while speaking to building pros during an EEBA webinar on April 7. "I remember navigating through 9/11. We immediately started focusing on cash preservation. For a small builder, that is the No. 1 strategy. We started right away looking at across-the-board pay cuts, deferring land deals."

Gravity first. Although a cloud of "disappointment" and fear lurks in the background, the most prevalent emotional state during the first 90 days of COVID-19 lockdowns was expressed in grateful and "thankful" terms.

When the first bailout bill from Congress passed, he explains, the company took the lifeline and ran with it. "It's extremely hard to build a good team," he says, "but so far, we've been able to hold onto them.

Myers says two things helped Thrive Homes as high-performance builders: "First, we've seen renewed loyalty from trades in Denver, with a high level of engagement and care," he notes. "Every framer on the jobsite this morning was wearing a mask. The partnership we've built [over the years] is serving us well.

"Secondly—I think we'll talk about this more, but—we've been focused on health... it's not always easy but now we'll be able to have that message resonate much more strongly as a building block for rebuilding our business."

To get a better barometer of where the industry at large is headed in the aftermath of the pandemic—assuming it will come eventually—our staff at *Green Builder* reached out to many builders, architects and manufacturers, looking for a general mood and what we all might expect over the coming months and years.

A TALE OF TWO REACTIONS

We'll share the results of our questions and interviews in this article. But before we do so, it's important to note that the views of these industries, by and large, differ dramatically from that of the general public. We know this, because we used our in-house data discovery service, COGNITION Smart Data, to probe public sentiment, mentions and mood about their future housing options.

What we found is that, by and large, Americans gradually circled inward psychologically for the first few weeks. This wasn't always the case. Early on, as COVID-19 lockdowns took hold, talk about remodeling, building and buying new homes saw an awakened burst of interest. The lockdowns didn't take place until end of the month in China and mid March in the U.S., meaning they would have had no effect on housing starts in January.

A FAST-CHANGING SITUATION

By early May, conversations had dwindled on the topic of new home purchasing and remodeling, as households hunkered down and the nation began "opening up" out of lockdown mode.

This re-opening, considered highly risky by medical experts, will likely determine whether the shelter industry can avoid a full-blown recession. It will test the public's capacity to take an existential threat in stride, yet still pursue the conventional American Dream of home ownership and family.

It's possible, as real estate expert John Burns suggests, that the crisis could boost home sales by giving millennials the push they need to abandon rental living and buy into the shelter dynamic of their parents. As a result, they'll be looking for single-family homes with outdoor play space, the traditional neighborhood model developed post World War II.

Of course, that cultural shift could create new problems in terms of our footprint on the planet. Denser populations tend to consume far fewer natural resources per capita than their rural counterparts. If housing does spread out into the fields and forests, growth patterns and housing performance need to be managed carefully. Net zero-plus homes with fossil-fuel-free energy sourcing and low impact transportation are both possible and essential to our future survival.

As the death count from COVID-19 in the U.S. surpasses more than double the American lives lost in the Vietnam War, it's clear that nothing is certain.Instead, we have entered a "limbo" period where politics often trumps science, and dangerous social experiments happen in real time. Can we return to "normal," now that the soft underbelly of our health care system lies bare, not to mention our fragile global economics and even our ability to sift the truth from lies? Is normal the best we can do?

THE INDUSTRY SPEAKS

Let's hear what those in our business have to say. The fog of the pandemic is lifting, but what lies behind it is still "murky." The comments that follow include numerous sources: our own interviews and surveys, and a few builder quotes and remarks from an April 2020 EEBA webinar.

"Less Activity, But Higher Conversion"

CR Herro, Vice President of Innovation
Meritage Homes, Scottsdale, AZ (Corporate Headquarters)

GB: Are you changing your offerings/ services?

CR: There's no doubt that the Corona Virus is having a long term impact on the priorities and capabilities of the general public, which creates changes and opportunities for business to respond to these shifts.

GB: Have your customer expectations/ demands changed?

CR: It is too soon to capture the impact that March and April will have that will persist in the zeitgeist this time next year. There are certainly rapidly growing skills, and therefore comfort, with remote communication, learning and purchasing that will likely increase the adoption of remote services. It is logical that a pandemic would increase health awareness and promote materials and strategies to better protect families. That will have to be borne out by market adsorption in the last half of 2020.

GB: What, if anything, are you doing differently on your job sites?

CR: We are trying to maintain as much normalcy as possible, while responding to almost daily shifts in corona requirements. There is still access to material and labor. Many builders have slowed speculative builds, which has provided the needed focus and capacity to build the backlog of sales from Q1.

GB: Have you changed the way you're selling homes?

CR: People have more time to research online, and the industry is promoting connection to the already robust online content that has been evolving for years. Additional research tied with appointment based onsite traffic means that there is less activity, but higher conversion, in the field.

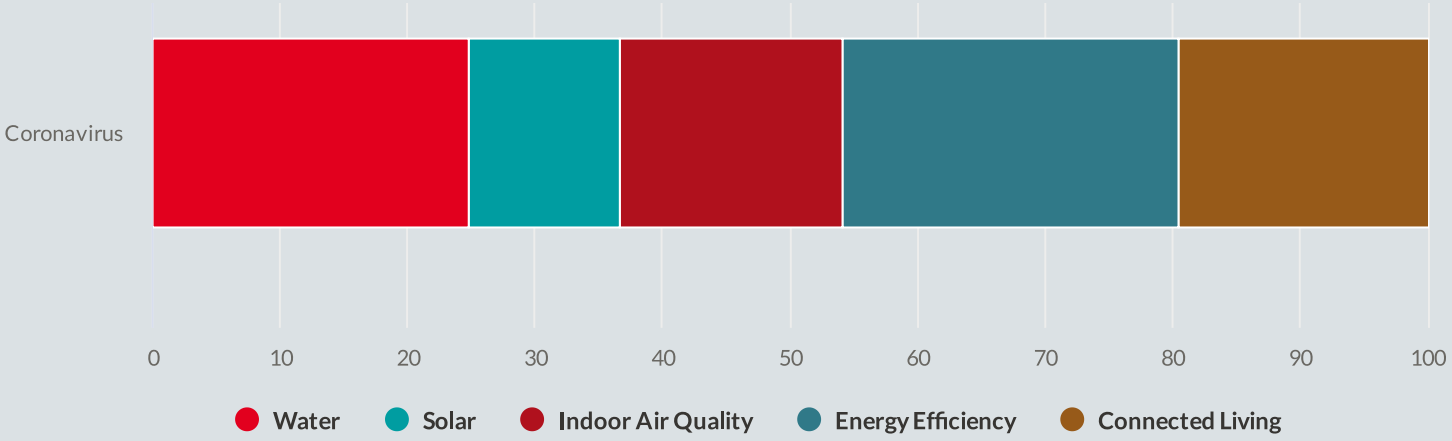
GB: Which aspects of building do you predict will be most impacted, and why?

CR: Based on the growing use of online tools and the current health awareness, those seem to be the largest areas that may have a long term impact on the buying preferences of the public, and are therefore create opportunities to adjust business practices to better serve customers and create new opportunities for innovative business leaders.

CREDIT: COURTESY OF MERITAGE HOMES

Still selling. Subdivisions such as Meritage Homes' Steel Canyon at Russell Ranch remain popular.

Talking Points: Essentials for Resilient Living



Related Conversations. When we correlate specific high-performance build terms with coronavirus discussions, water and energy efficiency arise most often.

"Changes in Expectations"

Tim O'Brien, President
Tim O'Brien Homes
Pewaukee, WI

GB: Is the Coronavirus changing your business?
TO: Yes, forcing us to look at how we can continue to sell without people coming out to models: a virtual selling strategy. We have developed new methods for selling under these conditions.

GB: Are you changing your offerings/ services? If so, what is driving you to do so?
TO: We are focusing more on the communication of how our homes can be healthier than a standard build. This includes filtration and air exchanges, in addition to reduced effects of outdoor air pollution with a tighter home. We are also looking to make the EPA's IAQPlus a standard for all homes.

GB: Have your customer expectations/ demands changed?
TO: Besides thinking builders will be desperate to sell homes during this time? We continue to engage prospective clients with virtual meetings like Zoom and FaceTime for field tours and home reviews. We expect to experience more changes in expectations as we continue down this path of COVID-19 as well as other potential concerns about coming out to visit a model if the periods of "all-clear" from our government and the CDC are not lasting.

GB: What, if anything, are you doing differently on your jobsites?
TO: More sanitation of areas (porta-johns, door handles and final cleaning scope changes). We enforce these, just like we would any other OSHA requirement.

GB: Have you changed the way you're selling homes?
TO: Yes. See above. We're also developing tools for virtual design appointments.

GB: Has the Coronavirus impacted your sales?
TO: Dramatically at this point. Still worked through a few people that we had in the pipeline before this all hit, but most people are in wait-and-see mode, as it relates to their jobs and the housing market; expecting a drop in prices. We continue to engage people through social media and other marketing strategies, so when we can get back into models, we can start writing contracts.

GB: Are you experiencing material shortages and/or changes in your supplier relationships?
TO: Not yet, but we do expect shortages in anything with sheet metal (HVAC, Appliances, etc.). Products coming from China will also be in short supply. We continue to discuss these challenges/concerns with our suppliers. Trades are holding pretty strong, but anxious about the impending slowdown.

GB: Do you think that the coronavirus will create systemic, long-term change in the building industry?
TO: Yes! More virtual engagement with prospects and customers; more focus in IAQ and built-in products that help keep surfaces cleaner. Design criteria will change too, with more working from home (WFH) office space, kids learning areas, food storage, connectivity, etc.

GB: Which aspects of building do you predict will be most impacted, and why?
TO: WFH, plus pantry storage, cooking and kitchen organizational options, and new emphasis on enough bandwidth and Wi-Fi coverage.

"Not a Market for Tire Kickers"

Robin Sheakley, President
Sibcy Cline Realtors
Cincinnati, OH

GB: How is the real estate market adjusting to COVID-19 realities?

RS: Realtors and their clients have made quick adjustments, allowing them to continue to market and show properties. For instance, sellers are requested to turn on all lights and open all doors prior to showing, and in return, buyers are asked not to touch anything in the house and to leave all lights on and doors open.

GB: Are you also doing business virtually?

RS: Of course. We've put our weight behind virtual open houses, and many agents have filmed detailed property tours that can be viewed prior to a buyer coming inside the house.

GB: So you know they're serious before they get a live tour, assumedly?

RS: Exactly. When buyers have viewed photos online, watched a virtual tour and still desire to see inside, agents move to in-person showings, but space them out to avoid any overlapping of interested parties. This is not a market for tire kickers.

GB: For the greater Cincinnati area, how are showings, sales and closings going in terms of volume?

RS: According to 4/9/2020 NAR Weekly housing monitor, new home listings are down 19 percent from one year ago and new contracts are down 20 to 40 percent in most markets from one year ago. Home prices are holding so far, with the majority the same or higher from one year ago.

GB: You suggest that the market will bounce back in a few weeks. What will have changed for good?

RS: Many people spent their time staying in place at home. In that time, they cleaned their homes, decluttered and made notes of wants and needs at home.

GB: So they'll want to make changes?

RS: It seems likely. Some are thinking their house is too big, too small, or they just don't like it anymore. In a few situations, people will emerge with a new perspective on work or family, or their financial picture may have changed, necessitating a move.

GB: Will the houses they want exist? Or will they want to start over and build new?

RS: Pre-virus, we were experiencing one of the tightest levels of inventory in history. As far as home-buying adjustments, we expect to see a shift in priorities. There will be a segment of the population that will have a heightened desire to be close to amenities such as parks, stores and restaurants. Ironically, there will also be a segment of the population influenced by social distancing who will be looking for privacy, land, and solitude.

GB: It sounds like you were pretty well prepared to handle this situation—but you're learning, too?

At Sibcy Cline, our agents have had the tools available for some time to conduct their work remotely, and we were able to extend that to every employee within 48 hours. We've launched a private group for social media support and encouragement, created an alternative way to collect earnest money, leveraged Microsoft teams for virtual sales and clients meetings, hosted live Continuing Education classes, held weekly all-company virtual town halls, and created a robust digital library for our entire Sibcy Cline family. The creativity has been incredible.

"Reducing Overhead"

Nathan Good, FAIA
Nathan Good Architects
Salem, OR

GB: How is the Coronavirus changing your business?

NG: Five of our projects have been placed on hold. Four of them are residential projects in design and one of them is a tasting room for a winery that shut down during construction. Our interior designer has been furloughed since April 1. Our other three architects have work on custom residential projects.

Each of us has been set up to work from our homes for the past two years with robust laptops, private office space, strong connections to our shared server at our office, and decent ergonomics.

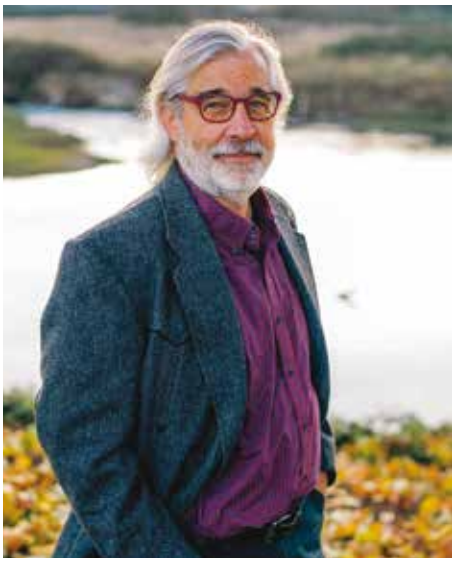
As our work diminishes and the possibility of the rest of my staff is on furlough status, my office will continue to cover the cost of their health insurance, paid time off (vacation, illness and holidays), and the time for us to stay in touch with one another.

Despite some philosophical hurdles, I did submit an application for a PPP – CARES Act grant. As with seemingly everyone else, I have heard very little about the status of our application. I've had hopes that it would help carry my staff through the next two to three months and developed a plan for their utilization if were a recipient. As the likelihood of a PPP grant not coming through, I am developing alternate scenarios for how my office will come out of this.

GB: Are you changing your offerings/ services? If so, what is driving you to do so?

NG: We have been able to reduce our overhead expenses by eliminating a number of expenses, negotiating a 50 percent reduction in our rent, and lower rates for our professional liability insurance. We are extending these savings to new and prospective clients through a reduction in our hourly rates.

A few years ago, we provided "aesthetic engineering" and sustainable design consulting services to civil and structural engineers for projects that they were the lead on. We are relaunching this service and have begun pursing bridge and infrastructure projects with engineering firms.



GB: Have your customer expectations/ demands changed?

NG: Our clients with projects nearing the completion of construction documents are anxious for us to submit the permit documents to the city or county in order to get construction started before residential construction is no longer deemed "essential."

A couple of our clients who were waiting until this winter to start the architecture and spring of 2021 to start construction are asking to move their timelines with us up. These clients speculate that they will get better pricing for labor and materials if they can start construction this summer or fall. Their concern is that if they wait until next year to build, more sub-contractors will be out of business, resulting in a labor shortage and higher prices.

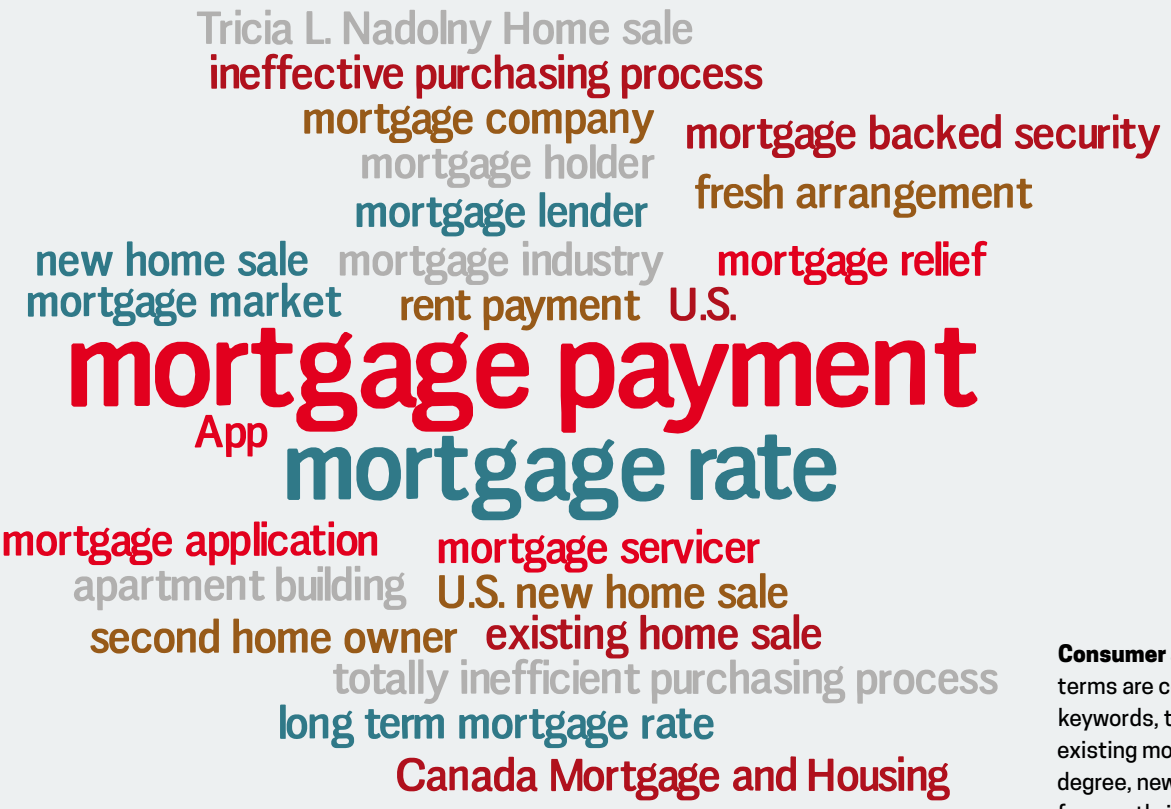
GB: What, if anything, are you doing differently on your job sites?

NG: Most of our job site visits are through FaceTime on our iPhones with our clients and the builders we work with. When we do need to visit construction sites, we respect distancing, wear face masks and avoid touching any surfaces.

GB: Do you think that the Coronavirus will create long-term change in the building industry?

NG: Probably not. The home building industry is like a large ship. It requires a great deal of force and distance to change directions. I do believe, however, that this crisis will result in a number of changes in housing design over the next few years:

- More desire for homes (and businesses) in less-densely populated communities (a flight from cities).
- An increase in demand for residential purchases and rentals that are less dense: less interest in apartments than single-family homes.
- A crisis in affordability coming from high unemployment and high demand for single-family homes will result in new neighborhood clusters of slightly larger than tiny homes, with shared commons and garden space.
- More demand for intentional communities and co-housing with smaller stand-alone homes, also with shared commons, gardens and guest quarters.
- An increase in innovative, cost-conscious, well-designed, ultra-efficient, manufactured homes, i.e., the Prius Home.
- More demand for homes with dedicated home-office space.
- Larger family rooms that double as space for home schooling with dedicated closets for school supplies.
- Converting garages for home offices, studios, home schooling, exercise and storage.
- Larger pantries for food and household supplies.
- An increase in edible landscapes: vegetable gardens, raised beds, fruit trees and greenhouses.
- A continued increase in healthy homes: methods to enhance hygiene, more heat-recovery ventilation systems (including retrofit and remodel options), less carpet and more hard-surface flooring, and continued efforts to keep pollutants, bacteria and viruses from entering the home.
- More time in the home will result in much higher energy bills, which will further emphasize the benefit of energy efficient homes.
- A continued interest in renewable energy systems to further reduce the cost of monthly energy bills.



Consumer anxiety. When housing terms are correlated with coronavirus keywords, the topics of rent, paying an existing mortgage and, to a lesser degree, new home purchasing show up frequently in social postings.

"Still Booked Solid"

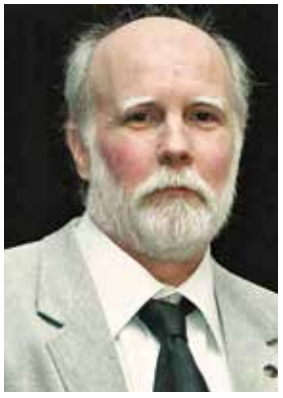
Ted Clifton, Owner/CEO Clifton View Homes and Zero-Energy Plans LLC, Bellingham, WA

GB: Is the coronavirus changing your business?

TC: We are in a state that has shut down all non-government residential and commercial construction, so yes.

GB: How are clients reacting?

TC: Our customers don't know what to do. They are stuck with half-finished homes, and banks that want them finished on time, but we are not allowed to work. We cannot get doors, because our door supplier is also shut down by the Governor. Without doors, we can't install the finish trim, even if we did "sneak in" and work.



GB: How are you retaining employees?

TC: Despite the Governor's orders, we have continued working where we have the products to do so. We have a very strict policy of only one person per job site, and NO trips to the store if you need more supplies. The lumber yards will deliver to the doorstep, so they don't need to come in, and we don't need to go out. This will only be a temporary change, but will continue as long as there is significant risk from the virus.

GB: Have you changed selling techniques as well, and what's the impact?

TC: No. As with Zero-Energy Plans LLC, we are already offering the right product at the right time. It's too soon to tell. We are still booked solid for about two years, and nobody has cancelled.

GB: Any material shortages?

TC: Certain products are simply unavailable due to the Governor shutting down the suppliers.

GB: What changes will the coronavirus impose upon the building industry?

TC: I fear we are going to lose a lot more small builders and subcontractors who don't have the staying power to weather this storm. I do not, however, foresee any lasting changes in the way we build homes as a result of this. That being said, I think a lot more people will be thinking about indoor air quality. Also, priorities may shift to features people feel are "must haves," now that they have been cooped up inside their homes for a month or more—but so far, I haven't seen what those might be.

Note: *Ted Clifton asked us to mention that his design company, Zero-Energy Plans, has had a more-positive COVID-19 experience than his construction firm, and has seen positive growth during the COVID-19 crisis, with more inquiries and more sales of plans for high-performance homes. The State of Washington was scheduled to re-open in four phases shortly after this interview was conducted (starting May 5). In the second phase, new construction would be allowed to resume as an essential business. —Editor*

"The Buyer is Still Out There"

Dennis Webb, Vice President of Operations Fulton Homes, Tempe, AZ

CREDIT: COURTESY OF FULTON HOMES

GB: Is the Coronavirus changing your business?
DW: Of course. Traffic and sales have dropped in half since the third week of March. But the buyer is still out there. Builders tend to take their eye off the ball and shut down mentally, but that's a mistake.

GB: So are you changing your offerings/ services to manage existing customers?
DW: We have about 550 homes under construction, and about 100 people we need to get through our design center—but they're not wild about coming in, so we're doing online appointments. This is all new for us, but it's getting great traction. They can select all finishes and interior options from another state or another city. It's something we will use in the future.

GB: So can final product selections be made virtually?
DW: Yes. And another benefit is that buyers can go into the virtual showroom any time before the appointment, and spend a lot of time to look at everything. We had one customer on there for 36 hours before the actual selection. Another spent 15 hours.

GB: How will you make up the dip in sales?
DW: We've got great salespeople who sell on 100 percent commission, so their livelihood depends on selling houses. They're extremely motivated and good at what they do.

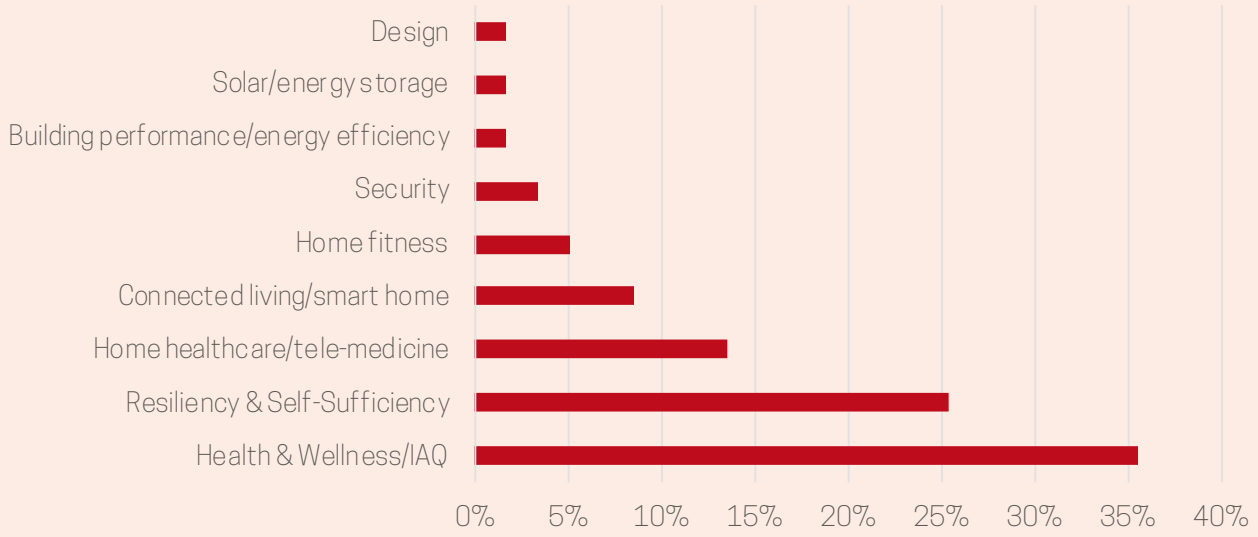
GB: So you're still having a lot of conversations?
DW: Yes, but you have to reach [clients] differently, so we're connecting with them via our website, email, phone calls, *Zoom* meetings.

GB: What, if anything, are you doing differently on your jobsites?
DW: Like everyone, we're practicing social distancing, limiting the number of trades in a home.

GB: Some builders report material shortages. Have you encountered those?
DW: No.

GB: Do you think that the coronavirus will create any lasting change in the industry?
DW: It will force builders to be able to offer services that don't require people to physically be in certain places.

According to a Green Builder Media survey, the most impacted sectors will be:



"Part of the Solution"

Frank Carroll, President/CEO
Broan Nu-Tone, Hartford, WI

GB: How is the coronavirus affecting your company?

FC: The coronavirus has affected Broan Nu-Tone in a number of ways. The downturn in new construction demand is the most-direct effect. We supply to most of the new home builders, so there is a direct correlation there for us. On the consumer side, now that they are spending more time in their homes, we have seen an emphasis in online sales for upgrade motors and grills. Internally, we have created a company-wide work-from-home strategy for those employees that are able. We have also emphasized and reinvented a "healthier" safe working environment for those employees that have to be in our factories, given we are deemed "essential," with ventilation and fresh air products.

GB: Did you expect this type of impact?

FC: Initially, I am not sure anyone saw this level of activity coming, but the team responded with the utmost professionalism. I am very proud of the way so many employees rallied together to enable our company to continue working while protecting employees at the same time.

So many functions come together to prepare for business in a new way—the finance team, the IT specialists, the HR team, our web specialists, and our remote customer service teams are just a few to call out.

Our real front line is our operations and factory employees that make our essential products. Because of everyone working together, we have been able to stay in business to support our customers and builders with the ventilation products they need to finish their jobs.

GB: What is your company doing to address the challenges caused by COVID-19?

FC: In our facilities, we have established a number of safety actions such as spatial distancing, encouraging use of masks, increasing sanitation, creating schedule adjustments, and providing consistent communication across teams.

However, while we have had to make some adjustments in our work, a big focus for our company has been on how to be part of the solution going forward. The importance of ventilation and fresh air has been a growing topic in this time, so we have been working on sharing our existing solutions and creating new product solutions that address that.

GB: How affected did you think your company will be if the coronavirus leads to a recession?

FC: Our business would definitely be affected by a recession, as would any other company. The one helpful difference that we have in working through a recession is a diversified business over a few different categories of ventilation, fresh air solutions and home appliances. This diversity is further complimented by our channel diversity via new housing, remodeling and regional balance.

> "We expect that more builders will not only want to meet minimum ventilation code requirements but go above and beyond with solutionsmthat offer premium indoor air quality."

Another element in fighting through a recession is new products and new market demand. The understanding of ventilation solutions and indoor air quality through this challenging time is increasing. With that we see opportunities for growth in the future, but we just have to help each other manage the near term.

GB: What are your customers doing differently?

FC: The immediate reaction we are seeing is that customers are looking for repair/replace/remodel solutions as well as more of a focus online. Our customers are also getting really creative with ways to service their contractors.

In addition, we are seeing more requests for sanitizing and clean air solutions. We recently launched *SurfaceShield*, a fan that incorporates a special light module powered by Vital Vio technology that limits the growth of mold, mildew, fungi and bacteria. This type of product meets this growing need.

From a builder's perspective, we see the building codes and ASHRAE specifications being published that are calling for more fresh air solutions, continuous run and minimum balanced air capabilities.

GB: How do you think the coronavirus will change the homebuilding sector in the short term (30-60 days)?

FC: In the short term, builders are completing the jobs and sites they started before the crisis, but home building statistics point to an expected short-term drop in manufacturing thereafter. With that, we expect that the discussion and topic of energy efficient, code-compliant ventilation—both whole home and bathroom/kitchen exhaust—will be at the center of builder conversations and considerations.

We expect that more builders will not only want to meet minimum ventilation code requirements but go above and beyond with solutions that offer premium indoor air quality. This will be a significantly more sought-

after feature in the eyes of health-conscious prospective buyers wanting to protect their families.

GB: How do you think the coronavirus will change the homebuilding sector in the long term (61+ days)?

FC: In general, our understanding is that many people are only delaying purchase activity, not giving up on it. So, we expect more of a V-shaped recovery. It may not reach forecasts of 3-6 months ago this year, but by next year we don't expect there to be lingering effects.

Specific to Broan Nu-Tone, we have already seen a lot of activity as builders turn to us to learn more about our fresh air systems and ventilation solutions. As stated above, I think the builder conversations will get more serious and start to incorporate more advanced fresh air options. We expect that all builders will now be accelerating their plans to incorporate these options into their homes. Previously, if offered, this was a premium option.

Building codes were starting to change, but we expect this crisis will accelerate all these discussions and actions. Now, building scientists will be sitting at the head of the table when home builders are creating the next generation of homes that don't compromise between health/indoor air quality and energy efficiency.

GB: How do you think coronavirus will impact consumer behavior in the short term (30-60 days)?

FC: As expected, there has been a shift to online buying. Consumers are looking around their homes to see what they can repair, upgrade and remodel themselves in the place they will be spending most of their time. As such, we expect our series of products that can be installed by the homeowner to upgrade their ventilation, their grill or add features without having to cut into the plaster/drywall will be helpful solutions for them.

GB: How do you think coronavirus will impact consumer behavior in the long term (61+ days)?

FC: We expect there to be a heightened awareness of indoor air quality and wellness topics from both the home buyer and DIYers. We also expect to see more building of Indoor airPLUS-certified homes for health-conscious buyers, and increased requests for higher quality ventilation systems or new solutions like our *SurfaceShield*.

GB: Any additional thoughts?

FC: While the events around COVID-19 are unprecedented and the timetable for when things return to normal are a little muddy right now, we believe that ultimately the experiences and knowledge gained during this time will have a positive effect on the green builder community, especially if they leverage the economic benefits of green building and the wellness opportunity that comes with a proper ventilation strategy to match it.

"Moving Ahead as Planned"

Ryan Moore, CEO
Green Insight, Albuquerque, NM

GB: Is the coronavirus changing your business?

RM: Not very much. We have 52 projects in four different states and the Cayman Islands, and we are providing testing and verification work on. We have one market-rate project that is slowing down that is under construction, but our other projects seem to be moving ahead as planned. We have signed $120,000 worth of projects in the last two months. The pipeline for future projects remains fairly robust as well, but we are not sure how long that will last.

GB: Are you changing your offerings/ services? If so, what is driving you to do so?

RM: Not really. We have had some discussion regarding offering an online LEED for Homes Green Rater mentoring program, but have not made any concrete decisions to do that yet.

GB: Have your customer expectations/ demands changed?

RM: We are all adapting to social distancing recommendations, which affects whether we send people into the field at all or how they operate in the field. A lot of our inspection work can be done via remote video, which works out well, but as far as the on-site testing we are taking precautions to make sure we are working alone in empty homes for the hour or so that we are there. We have suspended the on-site testing of occupied units. Everyone seems to be understanding, and we are not getting any pushback.

GB: Has the coronavirus impacted your sales or prospects?

RM: Not so far. We continue on pace to beat last year, but it's difficult to discern if this is really due to of increased sales effort. It could be that we would have been doing even better without the crisis, but business has been solid and it looks like it will continue in the short-term. It gets a little murky in the future, but most developers seem to be taking the attitude that this will be over in a few months and won't be a factor when their construction starts in 8-12 months.

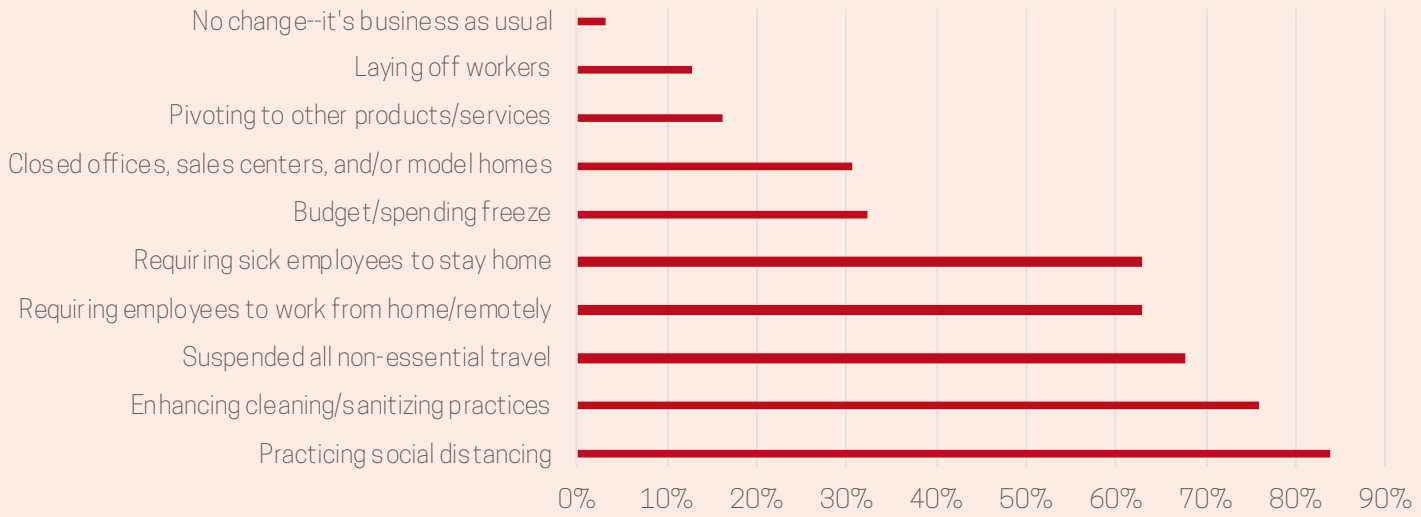
GB: Do you think that the coronavirus will create systemic, long-term change in the building industry?

RM: I think remote video inspections will become more common, but other than that I don't see much changing.

GB: Which aspects of building do you predict will be most impacted, and why?

RM: I'm really not sure residential construction will be much impacted. I think just about everyone is viewing the coronavirus as an unrelated crisis--and once it is defeated, it's going to be business as usual. If any changes stick, it will be because somebody figured out how to do something more efficiently and/or less expensively. For us, that would be the remote video inspections. On the consumer side, there might be more demand for better indoor air quality, which was already on an upward trajectory.

According to a Green Builder Media survey, builders are:



"The Industry Will Rebound"

Steve Baden, Executive Director RESNET, Lake Forest, CA

GB: How is the coronavirus changing how your organization works?

SB: The RESNET team already worked from dispersed home offices, so we will not be affected by the quarantine. To ensure employee and public health, RESNET employees will not be traveling to meetings or conferences [until conditions improve]. In addition, the RESNET Quality Assurance Team is working on alternatives to onsite quality assurance monitoring.

GB: So you're looking at ways to keep HERS energy ratings moving forward?

SB: Yes, but it's important to note that the pandemic is having an impact on the energy rating industry in two ways:

1. **Demand.** With the general slowdown in home construction, the demand for HERS ratings is expected to slow. RESNET is closely tracking rating activity to discern longer trends.
2. **Safe scheduling.** With all states having proclaimed social distancing, there will be challenges in scheduling ratings. Even though most states have determined construction as an essential activity and not affected by the close of business proclamations, there is the concern over HERS Rater safety.

GB: Can you translate what that means to someone trying to get a home rated?

SB: Sure. First off, we're providing guidance on how HERS Raters and Rating Field Inspectors can limit exposure to the COVID-19 pandemic when they go to a construction site to conduct the inspections and testing.

GB: That makes sense. Can any of the rating process be done remotely?

SB: We've proposed an emergency interim amendment to RESNET's standard, which will allow diagnostic testing alternatives. In other words, raters can allow default values in lieu of field testing.

GB: How can builders, architects and so on keep up with changes like that?

SB: We have set up a new web page—**RESNET COVID-19 Updates**—that keeps the industry up to date during the pandemic. The web page covers:

- RESNET COVID-19 Announcements
- Resources for Rating Industry on COVID-19 Pandemic
- General Resources on the COVID-19 Pandemic—Covers such resources as *OSHA Guidance on Preparing Workplaces for COVID-19*, *NAHB Construction Jobsite Safety Recommendations for Coronavirus*, and *Builder Coronavirus Construction Limits: State-by-State Tracker.*

GB: Will the coronavirus will create systemic, long-term change in the building industry or ratings such as HERS?

SB: At this time it's hard to say; [it] will depend on how long the pandemic and economic slowdown lasts. There are hopeful signs that the housing industry will rebound. Mortgage interest rates are historically low, meaning buying a home is more affordable, and with the federal Paycheck Protection Program, builders can keep staff rather than simply laying them off as happened in the 2007-2008 recession. This will mean that the builders will not lose the infrastructure and will be able to start building again.

GB: Which aspects of building do you expect to be most impacted?

SB: Healthy homes will become more normalized. High performance energy efficient construction is the foundation for a healthy home, and we expect to see growing interest from builders, homeowners and others in the future.

"Accelerated Shift to E-Commerce"

Rüdiger Schmitz, Vice President Trinseo, Berwyn, PA

GB: How is the coronavirus affecting your company?
RS: Trinseo's manufacturing operations are considered essential by government authorities around the world because we produce materials that are intrinsic to life-sustaining products such as medical devices, protective equipment and food packaging. Our plants continue to operate, produce and ship materials to our customers.

GB: Did you expect this type of impact?
RS: We are currently in uncharted territory but have been tracking this from early on to anticipate impacts and make plans to ensure the safety of our employees while meeting customer demand.

GB: What is your company doing to address the challenges caused by COVID-19?
RS: In any decision we make, we are guided through our core values of safety and Responsible Care®. Since the beginning of the coronavirus disease outbreak, Trinseo has set up a Global Crisis Management Team to closely monitor the situation and take appropriate actions, including precautionary safety measures inside our plants, offices, and other locations.

Safety hero. Trinseo routinely adheres to CDC guidelines for employee health and safety.

CREDIT: COURTESY OF TRINSEO

GB: How impacted do you think your company will be if the coronavirus leads to a recession?
RS: We intend for Trinseo to weather the storm. We are taking short-term actions to ensure short-term financial stability, as well as longer-term strategic actions to better position Trinseo in the future.

GB: What are your customers doing differently?
RS: Many of our customers supply critical resources for commercial and residential construction projects that have been deemed essential during this time. They've taken various steps to adhere to CDC guidelines while continuing their work, including ensuring their employees wear masks and staggering work shifts to reduce person-to-person contact wherever possible.

GB: How do you think the coronavirus will change the homebuilding sector in the short term (30-60 days)?
RS: We anticipate there will likely be a prolonged impact on construction overall. And while we can't know for certain exactly what changes may come of this, it may mirror the industry impact we experienced following the 2008 recession in many ways. We'll be keeping a close eye on consumer behavior and emerging megatrends in order to pivot and meet the new demands that the future presents.

While e-commerce already has a stronghold in retail and consumer spaces, we're likely to see a more accelerated shift to bring e-commerce into the B2B world with industrial goods. We expect companies will prioritize this much higher on strategic agendas than previously.

We anticipate there will be a heightened focus on safety and personal protective equipment, and that many aspects of the industry will move more rapidly toward

embracing digitization and Internet of Things solutions, which includes increased reliance on virtual tools in place of traditional face-to-face sales meetings and travel.

GB: How do you think coronavirus will impact consumer behavior in the long term (61+ days)?
RS: While it's too early to know just how consumer behavior will change in the wake of the COVID-19 pandemic, this is certainly something companies will need to consider as they plan for the future across each step of the value chain. We already see shifts in how consumers are spending their discretionary income, and this will likely continue as we experience volatility and uncertainty in the economy. Inevitably, this will place prolonged pressure on industries directly tied to consumer demand.

For example, hygiene is currently taking up more consumer mindshare, potentially making this a stronger purchasing consideration for the future. We've also seen a jump in do-it-yourself projects spurred by the increased amount of time consumers are spending at home. And similarly, demand of package food has increased as a direct consequence of the stay-at-home orders. This is expected to return to normal demands after the lockdowns are lifted. However, we expect this to happen gradually due to the controlled back to normal plans. As an industry, we'll need to closely monitor these changes and make considerations for where we can innovate to meet future demand.

"In This Together"

Bryan Fairbanks, President/CEO Trex, Winchester, VA

GB: How is the coronavirus affecting your company?

BF: COVID-19 has affected virtually every aspect of our business in one way or another. Like most companies, we are actively managing our business to respond to the conditions of this health crisis and continue to evaluate the nature and extent of its impact.

Without question, the Trex family has risen to the occasion. I couldn't be prouder of the way our entire organization has responded and how quickly they've adapted to the changes to our business. We are following all CDC and public officials' guidelines, along with implementing local emergency response plans at each of our locations, including our Trex Residential operations in Winchester, Va., and Fernley, Nev., along with our Trex Commercial Products and Staging Concepts facilities in Minneapolis. We are adhering to social distancing and sanitation requirements. In fact, we have team members that are fully dedicated to keeping all high-touch areas, such as break rooms, door handles, etc., continually cleaned on a 24/7 basis across all of our facilities to help ensure the safety and health of our workforce.

Thanks to our committed employees, our facilities have remained fully operational throughout this crisis and we have been able to continue production in a safe and effective manner to meet demand for Trex products.

GB: Did you expect this type of impact?

BF: This is truly uncharted territory. There are playbooks for fires, hurricanes and other natural disasters but the playbooks really haven't been written for pandemics that close down a large portion of commercial activity across the United States and, for that matter, the world.

That said, we've been able to use a lot of the pre-planning we've done for other disaster scenarios and apply those strategies and tools to respond to this crisis. Companies that have been proactive in their crisis planning and have response procedures in place, as we have at Trex, have been able to adapt more quickly and are better equipped to weather the storm.

GB: What is your company doing to address the challenges caused by COVID-19?

BF: As mentioned earlier, Trex is fortunate in that we have been able to remain fully operational during this crisis. Our manufacturing process allows for adherence to appropriate social distancing guidelines. As the industry's low-cost producer, Trex has considerable financial and operational flexibility. At this time, we have no supply issues; however, we maintain inventories of materials sourced from diversified geographies, which allows Trex to better tolerate short term supply chain disruptions. From an end-market perspective, we have approximately 100 exclusive distribution locations and 6,700 channel partner outlets where consumers can purchase our products.

One thing we are doing a lot more of is communicating – openly and often – with all of our Trex employees and associates, as well as with our channel partners. This is a time of tremendous uncertainty and we want our stakeholders to know that we are in this together. We communicate daily with the dedicated associates who are keeping our manufacturing facilities running, those who are in the field and our corporate employees that are working from home. And, through our sales team, we are maintaining close contact with our distributors, dealers and retailers to understand the impacts of this crisis on their operations and to ascertain the various geographic differences so that we may provide the most effective and meaningful support during this challenging time.

We also are taking steps to support our community—both on a national and local level. We have partnered with Feeding America and are currently donating the proceeds from the sale of all Trex® deck samples ordered through Shop.Trex.com to aide in domestic hunger relief.

At the local level, as we source [personal protection equipment] for our plants, we are also purchasing enough to be able to donate to our local medical community. Additionally, our research and development team identified a way to manufacture face shields for medical use – a prime example of how our teams are quickly pivoting and thinking not just about our own needs but those of others in the community.

GB: How impacted do you think your company will be if the coronavirus leads to a recession?

BF: Trex's generally conservative financial structure allows us to be able to work our way through virtually any type of downturn scenario.

From a financial perspective, we are in a strong cash position with almost zero debt, and a credit line that affords us strong liquidity. Additionally, Trex generates substantial free cash flow, which gives us great financial flexibility.

Our growth strategy also positions us to better handle a recession. Our primary business focus is on converting an increased share of the wood decking market to Trex composite products. The deterioration of wood decks will not take time off during an economic downturn and recent product introductions from Trex, offering pricing that competes more directly with wood, position us to help fill consumer demand at the entry level more readily, particularly for homeowners with a DIY talent.

GB: What are your customers doing differently?

BF: Our channel partners have suddenly found themselves in a completely changed selling environment with an entirely different set of rules and conditions from the normal face-to-face transactions for which they are normally equipped. They are having to figure out how they can effectively sell to their customers while maintaining appropriate social distancing and conducting no-touch transactions either via telephone or online. They are also making revisions to accommodate delivery of Trex products in a safe and effective manner to the end consumer.

GB: How do you think the coronavirus will change the homebuilding sector in the short term (30-60 days)?

BF: It's a mixed bag out there right now. In some areas, contractors' phones are ringing, and decks are being built. In others, business has come to a standstill due to mandated shutdowns. Across the country, we are seeing strong results from our Decks.com website, which appeals primarily to the DIY homeowner. I expect we will continue to see strength in the DIY sector, which will benefit our retail and channel partners. Given the latest reports on the virus, we don't anticipate any major changes in the next 30 days but are hopeful that we will begin to see a wide re-opening of commercial activity within the next 60-90 days.

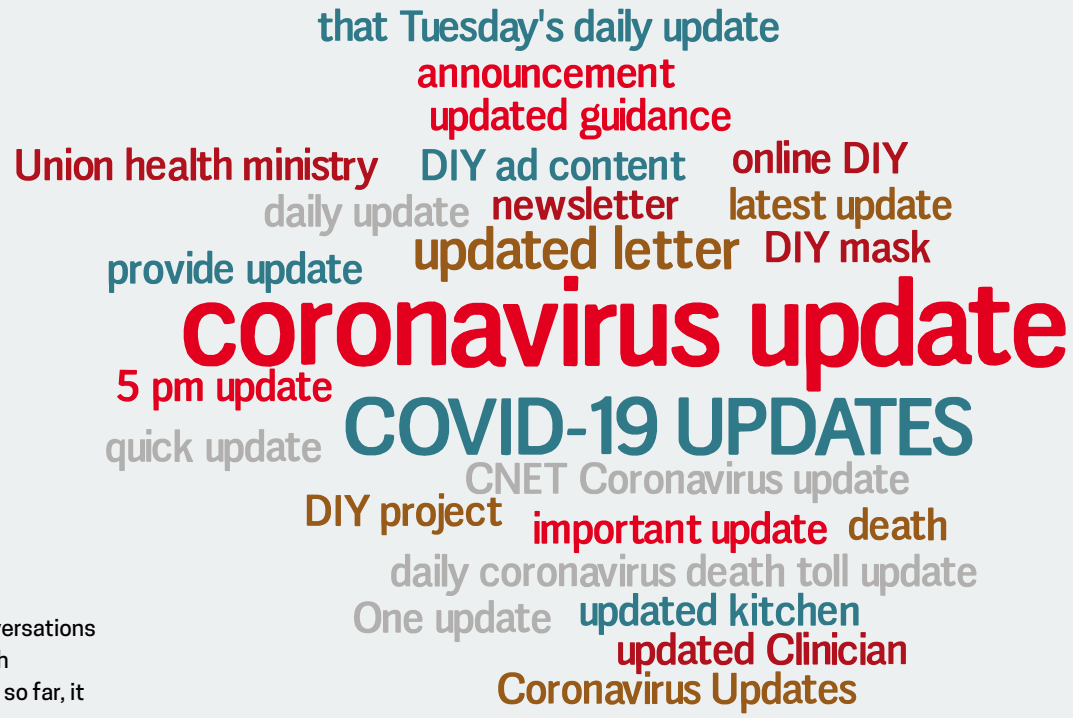
GB: How do you think coronavirus will impact consumer behavior in the short term (30-60 days)?

BF: A positive impact of this crisis on our industry has been an increased interest among consumers in their homes – including the spaces that extend the home to the outdoors. As people are spending more time at home, they want to have attractive and low maintenance living spaces. Having more time on their hands, many are tackling home improvement projects themselves.

At Trex, we've seen an uptick in traffic to our website since the shelter-in-place orders have been issued. We believe there will be increased demand for products that add beauty, value and are easy to maintain. The Trex portfolio of products clearly fit into that trend.

GB: How do you think coronavirus will impact consumer behavior in the long term (61+ days)?

BF: We anticipate that interest in the home will continue for some time as a result of this crisis, which bodes well for our industry. People will have had time to view and experience their homes in a different way and as we emerge from a period of economic uncertainty, consumer confidence will return and homeowners will feel comfortable investing in value-added improvements to their homes, such as decks and outdoor living spaces.



DIY projects. Although conversations show a minor correlation with remodeling and DIY interest, so far, it hasn't been a market changer.

"Digital Transformation"

Brett Joerger, CEO
Westhaven Solar, Yuba City, CA

GB: How is the coronavirus affecting your company?

BJ: As a company, we've been very fortunate that every one of our employees remains healthy during this time. While it has made us leaner as a team, we continue to operate and accommodate customers on essential services as appropriate. With permit jurisdictions tightened up, we are able to service a select number of cities and counties.

Overall, the pandemic has brought on tremendous opportunities for us in terms of a digital transformation. More than ever, it has enabled us to meet our customers where they are – and that is online.

GB: Did you expect this type of impact?

BJ: No one anticipates this kind of impact so soon nor can any protocol or strategic plan really address the needs of a business entirely, especially during a global health crisis. Where we were six weeks ago compared to today is inconceivable. However, as a next-gen visionary company on the front lines of driving a more sustainable future, this type of impact further underscores the need for cleaner, reliable energy in the world.

GB: What is your company doing to address the challenges caused by COVID-19?

BJ: We've reevaluated our 2020 approach and execution across the organization. In this time of uncertainty, we take it one day at a time because at the end of the day, we're human too.

More driven than ever before by our purpose to bring reliable power and savings to our customers, we begin each morning with a huddle and disperse to conquer the day.

As a team, we work diligently and remotely where we can, practice CDC guidelines, and continue to help sustain the energy optimization and efficiency of communities.

With limited resources and permit jurisdictions in some of our service areas, we do our best to work smart. As such, our departments have banded together as a collective to continue to deliver on our company's promise, regardless of the challenges.

GB: How impacted do you think your company will be if the coronavirus leads to a recession?

BJ: We are an essential part of sustaining homes during this time, especially during the upcoming wildfire season and power shutdowns. We are on a cost-absorbing model and foresee the company strategically scaling with the economy and customer demands.

GB: What are your customers doing differently?

BJ: Our customers are more engaged with us online and over the phone. As we are an essential part of their everyday lives and our products can improve the quality of life, there is a sense of urgency for our customers. They are quicker to purchase than pre-COVID-19.

GB: How do you think the coronavirus will change the homebuilding sector in the short term (30-60 days)?

BJ: In the short term, we think it will slow down and tread conservatively. However, given that the sector continues to be an essential priority, we continue to see construction proceed accordingly.

GB: How do you think the coronavirus will change the homebuilding sector in the long term (61+ days)?

BJ: We believe the homebuilding sector has already experienced its recession from the past mortgage meltdown. While we imagine it will begin to slow down as builders and companies trim their teams, we believe it is an opportunity to explore clean energy technology and automation for construction and homebuilding.

GB: How do you think coronavirus will impact consumer behavior in the short term (30-60 days)?

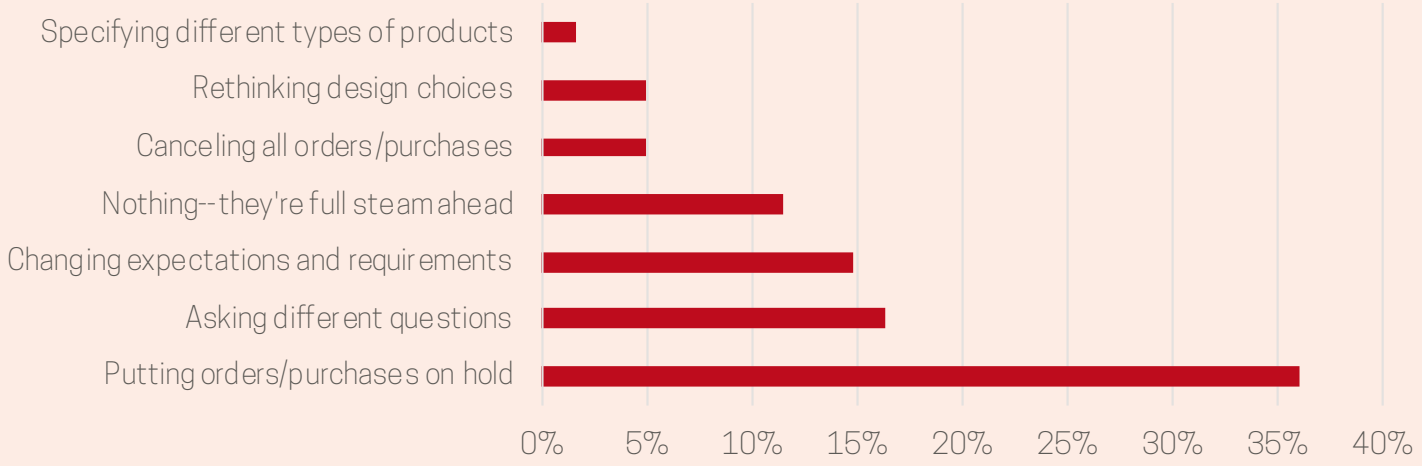
BJ: Pre-lockdown, we saw everyone panic purchase out of anxiety and from fear of shortage surrounding essential products. In the next few weeks, consumers will have adjusted to the new normal of a stay-at-home lifestyle. The demand for new homes or home building will continue to plunge in tandem with the unemployment rate.

GB: How do you think coronavirus will impact consumer behavior in the long term (61+ days)?

BJ: We will see more house upgrades versus new project add-ons or property purchases because people want to improve the place in which they live—especially as they spend 24/7 in the home during this pandemic.

Consumers will move into preservation mode for survival and only engage with essential and necessary products and services. For the general consumer, buying a home in a market where over 22 million are unemployed is a risky business.

According to a Green Builder Media survey, consumers are:



"Good Communication is of Utmost Importance"

Judy Hedreen, Vice President/ Co-Owner
Peter Ollestad, Vice President of Sales
Strasser Woodenworks, Woodinville, WA

GB: How is the coronavirus affecting your company?

JH: We have taken several definite steps to protect, safeguard and support our employees. All our customer service associates are working remotely from home; we reacted quickly and invested in new laptops, printers, and cell phones for our customer service people. In addition, all management was given the opportunity to work from home, and encouraged to do so. And our essential factory workers are instructed (and reminded) to keep "the distance" from each other. They are also all wearing protective gloves and the majority are wearing face masks which are supplied by the company.

GB: Did you expect this type of impact?

JH: I don't think anyone could have imagined such an impact—not just on our industry, but our country and the entire globe—but when such catastrophes happen, it's those companies that react quickly and that make compassionate smart moves with the welfare of their associates in mind that will survive and thrive over the long haul.

GB: What is your company doing to address the challenges caused by COVID-19?

JH: To ensure a safe environment for all, we made sure that:

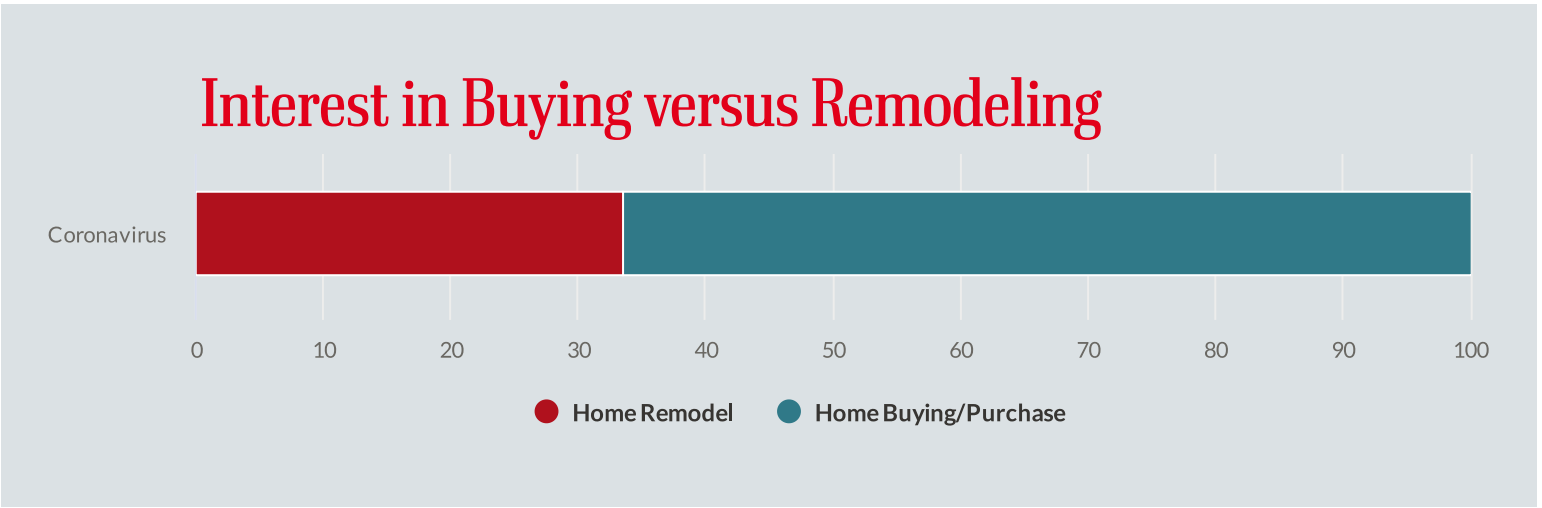
- All machines, door handles, light switches and bathrooms are disinfected with 75 percent alcohol solution several times daily.
- Employees are wearing protective gloves and the majority are wearing face masks which are supplied by the company.
- Sanitary hand wipe containers and 75 percent alcohol spray bottles are placed throughout the company for cleaning hands and/or equipment throughout the day.

GB: How impacted do you think your company will be if the coronavirus leads to a recession?

PO: I anticipate Strasser will be in a better position than some, as we are a true "Made in the USA" company, and COVID-19 has shown us the absolute value of having products made in America, and not just in our industry. I believe it is imperative to have U.S. domestic production of almost all goods and services.

GB: What are your customers doing differently?

PO: Our customers are spending more time online, which is why we consistently work to stay top of mind, and remind them we are their design partner and are available to support them in any way we can. Good communication is of utmost importance right now, and we'll continue and grow our efforts to stay in touch with our industry partners and customers in the places they are going to online, including builder, kitchen and bath, and designer-focus webzines, blogs and newsletters, and social media. We also send out periodic "Constant Contact" updates with important news about our company and the information and resources our industry partners need now, from price lists to catalogs.



"Prices are Holding"

Ken Gear, CEO Leading Builders of America (representing production builders, Washington, DC)

GB: How is COVID-19 changing things for production builders?

KG: These are unprecedented times. Everyone is doing his or her best to comply, with the number one issue being the safety of workers and customers, and making sure protocols are in place. Clearly, there has been a drop in customer traffic through the job sites, but in most places we can stay up and running with social distancing in place.

We're seeing a lot of creativity with virtual home models, including using *Zoom* to walk around with an iPhone and show a virtual tour. It's challenging, but most of showings are by appointment, with no one else actually in the home. Trades are allowed in the home one at a time, so ten workers maximum. This may slow down construction time.

GB: Have you been forced to lower prices?

KG: To date, prices are holding. Traffic has slowed down, but the crazy thing is that it was already a great year for the housing market coming into [the virus crisis]. The fundamentals are strong. We're still seeing people out there looking, but it is more challenging. Sales are not as strong as a few weeks ago.

GB: Your organization got involved with PPE gear, yes?

KG: We put out a call to action on protective gear. As an organization, we conducted an industry-wide effort, and delivered 175,000 pieces of equipment to hospitals and medical facilities. That was literally cleaning out stock rooms and backs of trucks. These were masks and eye protection. The production builder CEOs put out a call to get this equipment to the medical industry, and we are very proud of how the industry responded. We set up 20 drop off spots in the top 20 markets. Some contractors personally delivered equipment directly to hospitals.

GB: What's the biggest challenge for production builders in the coming weeks?

KG: One of the critical issues now, the life blood of the industry, is mortgage liquidity. We are seeing what the government did with the CARES Act, and providing forbearance [for renters and home owners] and that is a great idea in this time. But what about the servicers? The payment from the buyer goes to a mortgage servicer, who takes some money, and then the rest goes to the investors of mortgage-backed securities. Servicers have to pay the investors regardless of what's going on. Without the money coming in from the buyers, the banks are now afraid to take on new loans, so that creates a liquidity problem. Mortgage and rents make this system run and when they stop you can't expect people in chain to meet obligations.

LBA is doing its best to explain this to policy makers that they need to do a short term loan or credit facility so servicers can pay investors. We have seen signs of FICO score increase for home purchases. They are saying not lending anymore, unless it is to a super high quality buyer. This is an issue working hard to educate folks on the hill.

GB: Do you foresee permanent change in the industry going forward?

KG: I guess what I would say this is very different from the great recession. I think reaction will likely be different as well. We had very stable and hot market coming into the year this time, so there was demand there. Mortgage standards are tighter, and most people have equity in their homes and are not under water like during 2007-8. They have equity and the housing supply is tighter dramatically. Fundamentals are good and builders will look forward to getting back to work.

GB: [But] some financial business can be done online now, right?

KG: Yes. Because people can't get together, there are online or drive-through closings in most states. The notary stands next to the car, or even if they do meet in person, there is Plexiglas down the center of the table. There are also *Zoom* meetings and *DocuSign* allowing the notary to watch from afar.

Note: *Other online virtual conference formats are probably more secure than Zoom, including* **Microsoft Teams**. *—Editor*

"A Fair Amount of Bounce-Back"

Qianyan Cheng, Co-Founder/Vice President of Product Development, INOX, Sacramento, CA

GB: How is the coronavirus affecting your company?

QC: The modern-day supply chain makes it hard to keep such an impact to only certain businesses, so coronavirus has affected INOX as well as our customers and vendors primarily through loss of sales revenue. Fortunately, INOX was able to remain fully operational as an essential manufacturing business. We quickly implemented new product offerings and marketing campaigns in order to meet new market demands and create new business opportunities.

GB: Did you expect this type of impact?

QC: We knew the impact would be inevitable and serious, which pushed us to act quickly. We stayed informed about what was happening overseas, discussed changes to our daily operations and planned new product strategies early on which set us up to be more successful.

GB: What is your company doing to address the challenges caused by COVID-19?

QC: INOX implemented several measures to ensure employees' safety. We sourced masks and gloves for our production and warehouse employees, and supplied webcams and headsets for our office staff in order for them to successfully work from home. Company leadership held daily meetings with each individual employee to check on their health and provide support, and our customer service team executed a "smile and dial" with our customers. We have donated medical masks to distributors and clients who live in critical areas and may be in need of additional protection.

We also quickly shifted our research and development focus to products that can help lessen the spread of harmful bacteria to make them immediately available to hospitals and healthcare facilities. We developed *INOX MicroArmor™*, a powder coating infused with antimicrobial technology that offers 24/7 protection once applied to any commercial or residential hardware.

GB: How impacted do you think your company will be if the coronavirus leads to a recession?

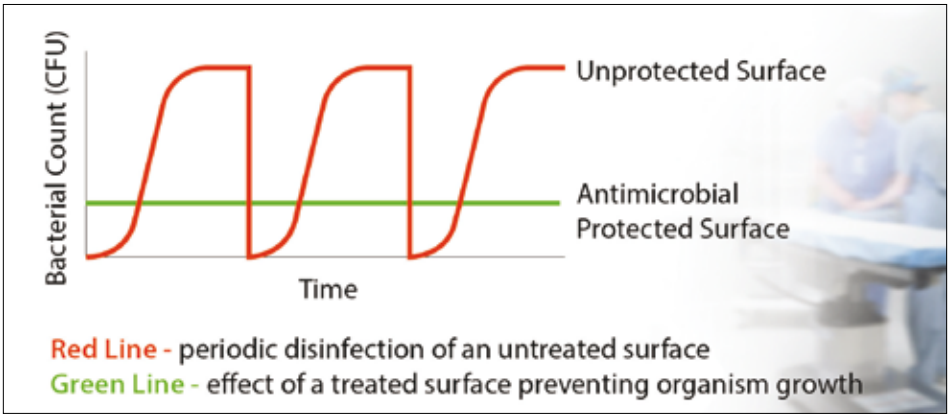
QC: Although we anticipate that the hospitality industry will be slow to recover, INOX is also seeing new business opportunities in healthcare and other institutional construction projects. Hospitals, healthcare facilities and schools are accelerating construction projects to renovate facilities and incorporate more sanitation and safety measures.

GB: How do you think the coronavirus will change the homebuilding sector in the long term (61+ days)?

QC: With millions working from home, we anticipate the door and hardware industry will see an increased demand for pocket doors or sliding doors to section off areas of the home and create more private office space.

GB: How do you think coronavirus will impact consumer behavior in the short term (30-60 days)?

QC: Right now, consumer purchases are trending heavily towards products that will create a healthy home environment, so door hardware should still be a fair amount of bounce back with market demand, especially in the affluent market.



CREDIT: COURTESY OF INOX

Higher priority. In response to COVID-19, INOX developed MicroArmor, an antimicrobial powder that provides constant surface decontamination compared to less-reliable, periodic cleaning products.

GB: What are your customers doing differently?

QC: Our retail customers are shifting their focus to establish a strong online presence, including updating their online stores and increasing social media posting and engagement. Our clients in new construction as well as OEM have seen a large shift from using traditional swing doors to more space-efficient sliding doors, especially in the healthcare industry.

GB: How do you think the coronavirus will change the homebuilding sector in the short term (30-60 days)?

QC: Overall, we estimate that shelter-in-place orders may negatively impact current homebuilding and home renovations, but there with antimicrobial protection or touchless controls are more attractive than before.

GB: How do you think coronavirus will impact consumer behavior in the long term (61+ days)?

QC: Research is showing that consumers will continue to prioritize products that increase health and wellness and will incorporate these into their daily routine well into the future, so research and development, and innovation, will need to shift to meet this demand. It will also be important for manufacturers to maintain a strong online presence, as there may be a lasting effect of the tremendous growth in online purchasing and spending.

Clean Living

Few products can reduce pandemic risks at home better than self-sanitizing toilets, HVAC and touch-free appliances. Here are eight standouts available today.

APRILAIRE HEALTHY AIR SYSTEM

Aprilaire's three-part *Healthy Air System* is designed to thwart the presence of COVID-19 in the home by providing improved fresh air ventilation, filtration and humidity control. The company offers a variety of components that help create a complete clean air-producing network.

For example, knowing that the air indoors can be five times more polluted than outdoors, Aprilaire offers its *Model 8126X Ventilation System* and *Model 8140 Fresh Air Ventilator* as ways to bring in the recommended amount of fresh air. Meanwhile, the company's *MERV 16 Allergy & Asthma Filters* can capture up to 96 percent of airborne particles the size of viruses—about 0.03 to 0.3 microns, in COVID-19's case. And, because proper humidity reduces the transmission of viruses, Aprilaire offers humidifiers such as its model 600, 700, and 800 units to keep indoor humidity within the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE)'s recommended 30 percent to 60 percent level.

www.aprilairepartners.com

COURTESY OF APRILAIRE

BOSCH *CLIMATE 5000* MINI-SPLIT HVAC

The *Bosch Climate 5000* series focuses on individual rooms and living spaces. Thanks to a multi-part filter system, the unit is a powerful line of defense against allergens, odors, viruses and bacteria.

The Energy STAR-rated system utilizes electricity to pump refrigerant and transfer heat from one space to another. In cooling mode during warm or summer months, the system efficiently moves heat from inside the space to the outdoors. Conversely, in heating mode during cold or winter months, the units utilize refrigerant, which is naturally colder than outdoor temperatures, to absorb heat from the outside and transfer it to inside the space.

COURTESY OF BOSCH

Because it requires no large diameter duct work, *Climate 5000* can be retrofit into existing homes with minimal tear-out, as well as new home installs. The condenser is conveniently located outdoors, while up to five air handlers can be placed inconspicuously indoors.

www.bosch.com

CARRIER *INFINITY* AIR CONDITIONER AND HEAT PUMP

Carrier's two new flagship products—the *Infinity 26* air conditioner and *Infinity 24* heat pump—offer a one-two punch in the battle against moisture, mold and various air toxins.

The *Infinity 24* is the only ducted product on the market with a variable-speed, five-ton heat pump to achieve 13.0 Energy Efficiency Ratio (EER). The *Infinity 26* and *Infinity 24* also include enhanced dehumidification and can remove up to 400 percent more moisture than a single-stage system.

COURTESY OF CARRIER

Each unit also includes an *Infinity* air purifier upon purchase. The purifier uses "Captures & Kills" technology: With every cycle of air that passes through this patented air purifying system, pollen, animal dander, bacteria and other pollutants are trapped and held tightly to the filter. An electrical charge then bursts the cell walls of pathogens it comes in contact with. Up to 95 percent of particles are trapped and up to 99 percent of germs and viruses are eliminated or inactivated. (Note: This product has not yet been tested for effectiveness against the *novel coronavirus (SARS-CoV-2) that causes COVID-19*.)

www.carrier.com/residential

INOX *MICROARMOR* ANTIMICROBIAL COATING

This company's line of stainless steel products, including residential door levers and pulls, deadbolts, panic devices and push/pull plates, now feature its *MicroArmor Antimicrobial Coating*—a powder coating infused with antimicrobial technology that inhibits the growth and reproduction of harmful bacteria, mold and mildew by up to 99.9 percent.

COURTESY OF INOX

INOX *MicroArmor Antimicrobial Coating* contains silver ions that attach themselves to a microbe's cellular enzyme to block growth of the microbe, reducing the spread of bacteria, fungi and mold. During the manufacturing process, the powder coating is applied to an INOX product and the silver ions within the coating integrate with the product itself. This enables the hardware to have around-the-clock protection that does not wash off or wear away, and remains effective in reducing the growth and spread of bacteria.

The antimicrobial technology is approved by the Environmental Protection Agency. It has not been tested for effectiveness against COVID-19.

www.inoxproducts.com

COURTESY OF LEGRAND NORTH AMERICA

KOHLER *EIR INTELLIGENT TOILET*

Eir, Kohler's new intelligent toilet, knows what people right now are worried about the most—the coronavirus. The unit's one-click sanitizer button activates electrolyzed water and ultraviolet light—the bane of all things COVID—to clean the toilet's bowl and wand, ensuring unparalleled hygiene and peace of mind vs. bacteria and viruses.

There's also a bidet function, complete with a water filtration system that purifies and removes impurities, residual chlorine and heavy metals from water sprayed from the wand. Filtering the water also protects the bidet against clogging from sediment and mineral build up. Other features include heated seat, customizable cleansing, a night light, hands-free opening/closing, automatic flush, and a touchscreen remote.

The unit can be installed against the wall—as opposed to the floor—which hides the toilet's various connections. It also comes available with P-trap or S-trap for low water pressure environments. And, the LEED-compliant product is capable of 0.8 and 1.1 gallon-per-minute dual flush modes.

www.us.kohler.com

COURTESY OF KOHLER

LEGRAND *WAVE SWITCH*

The *Wave Switch* from legrand's *adorne Collection* allows users to turn lights on and off with a wave of the hand—preventing germs from spreading onto hands and from surface to surface in the kitchen, bath and other high-traffic areas of the home. It's also an easy way to turn lights on or off if the homeowner's are full or messy.

Wave Switch can be used on its own to control a light from one location (single pole) or paired with a second switch or dimmer to control a single light source from two locations three-way). It's a simple do-it-yourself item, sized to fit a basic electrical box and requiring about 15 minutes to install. It does need a specialized wall plate, available in various designs and colors from the manufacturer.

www.legrand.us

COURTESY OF SONOMA FORGE

SONOMA FORGE *SANS HANDS* FAUCET

With the World Health Organization's revelation that viruses such as COVID-19 can live on stainless steel surfaces for days, there's a greater concern over the cleanliness of public and household faucets. Sonoma Forge's hands-free faucet—appropriately named *Sans Hands*—features an electromagnetic sensor, as well as a rustic nickel finish with a clear powder coat that protects the finish, and has antimicrobial properties.

Sonoma Forge created *Sans Hands* technology by combining a low-voltage current with an electromagnetic field. When a user approaches the faucet and interrupts the electromagnetic field, the faucet valve opens to begin the flow of water. When the user walks away, the water stops, helping with water conservation. Touchless faucets also make it easier to keep the bathroom clean since there are no handles to collect water spots and soapy buildup.

www.sonomaforge.com

WHIRLPOOL *KITCHENAID* DISHWASHER WITH *PRINTSHIELD* AND *FREEFLEX* THIRD RACK

With stainless steel appliances, fingerprints can be a nuisance. Whirlpool's *KitchenAid* line of dishwashers resists smudges and fingerprints, and can be easily cleaned with water and a soft cloth, thanks its *PrintShield* finish.

COURTESY OF WHIRLPOOL

The refrigerators also include the massive *FreeFlex Third Rack*, capable of housing six-inch drinking glasses and more. It features rotating wash jets to clean items in the rack, a drying bar with tabs that help wick moisture off glasses and a removable utensil tray for cooking tools. An adjustable middle rack adds flexibility to fit tall items like a stand mixer bowl.

KitchenAid units also use *ProWash Cycle* sensors to measure soil levels throughout the cycle, and adapt wash time and water temperature as needed for tough messes or lighter loads, saving water and energy.

www.whirlpool.com

The Pandemic-Resistant Bathroom

To avoid spreading infection, you need to take strict control of the family bathroom.

In the palm of your hand. There are more ways to catch COVID-19 in the bathroom than anywhere else in the house.

MOST PEOPLE CATCH COVID-19 from family members, and the home bathroom is literally a petri dish of infectious opportunity.

To start, most bathrooms are small, intimate spaces. The good news is that they've typically got hard, washable surfaces that can be cleaned with a bleach solution or other disinfectant.

The bad news is that the bath is where we do the dirty work of being sick: diarrhea, vomiting, nose blowing—you get the idea. Every surface, from sink handles to shower faucets to tile shower walls, is a potential hot zone, along with fabric curtains, blinds, towels and vinyl shower curtains.

To make matters worse, each time you flush an uncovered toilet, you **blast disease causing particles into the air** as an aerosol. Tests have shown that this can happen for several days after just one use of the toilet, and airborne particles tested have included norovirus, influenza and more. You can be certain coronavirus will easily become airborne.

Another issue particular to COVID-19 is that it has been shown to survive for hours, even days on clothes and hair. If you have towels, bathrobes or hand towels stacked in the bathroom, the virus can settle on them and stay there.

The point is to try to cool down this hot zone as much as possible. Here's how to do the best you can with the technology that's available, and a few behavioral adjustments. Let's start with the easy changes, and move up the options chain from there:

1. DESIGNATE A SICK BATH

About half of U.S. homes have only one bathroom. For the other fortunate half of homeowners, one bath can be reserved for those who are sick. Both baths still need to be managed with the protocols below, to avoid infecting the whole home.

2. RELOCATE ALL SOFT MATERIALS

Store towels, diapers, floor mats and any other fabric materials elsewhere. Do not leave half-used bars of soap or wet washcloths in the bath.

3. STRIP DOWN THE SHOWER

Get rid of that decorative outer layer of shower curtain. Stick with washable vinyl or plastic. In the future, try to replace the enclosure with smooth glass doors. Wash the entire shower space down with disinfectant frequently. Avoid bathing in the tub—don't spend longer in the bathroom than you need to.

4. RUN THE BATH FAN CONSTANTLY

Bath fans are not just for odors. They remove particulates too, including airborne viruses and bacteria. Never shut it off when you have sickness in the house. If you don't have a ceiling vent fan installed, open a window and put a fan in the window facing outdoors, and run it constantly. Get a bathroom fan installed as soon as you feel better. New ones such as the **WhisperGreen Select** from Panasonic are quiet and energy efficient.

5. CLOSE THE TOILET AFTER EVERY USE

If you or your kids have a hard time remembering this, you can make it happen automatically. There are many models of automatic seat closers available, and some are completely hands-free. For example, the iTouchless sensor toilet seat, available for about $150 as an add-on, includes sensors that make it self-opening as well as self-closing.

6. BIDETS: GO PAPERLESS

Aside from the cost and anxiety of running out of toilet paper, a roll of toilet paper left out in the open in the bathroom becomes a settling ground for viral particles. Avoid TP entirely by installing a bidet or low-cost bidet seat that uses water instead of paper to clean your bottom. If you want to spend a little more, you can get a self-sanitizing version such as the C3-155 unit from Kohler, and you will never have to stand in line for toilet paper again (see sidebar, "Bidet Brilliance").

7. LIGHT IT UP

Daylight may kill some forms of bacteria, mold and viruses, although its impact on coronavirus is not well documented. Let the sun shine in. You can also buy GermAwayUV's UVC sanitizing and disinfecting handheld wand or a similar device to manually kill many forms of invisible pathogens. Look for one that produces light in the UVC spectrum. It's likely that soon, room-scale UVC lighting will be available that can sterilize an entire bathroom.

Do your best to make your bathroom unfriendly to coronavirus, and the same protocol will help you avoid the flu and other less dangerous infections in coming years. Good luck. GB

MORE INFORMATION CAN BE FOUND AT:

- *Initial Hygiene:* "How can you catch diseases through the air?"
- *LarsonElectronics:* "How does UV light affect the coronavirus?"
- *Nature:* "Far-UVC light: A new tool to control the spread of airborne-mediated microbial diseases"

It's a wash. A toilet paper shortage and public curiosity has finally made bidets cool with Americans.

CREDIT: TED & DANI PERCIVAL/FLICKR

Bidet Brilliance

Toilet paper takes a back seat to this increasingly popular bathroom tool.

TOILET PAPER HOARDING and public curiosity has helped Americans discover what the rest of the world already knew: bidets are pretty cool thing. They also save thousands of trees annually that might otherwise be ground into the virgin white paper rolls we all love.

A mass TP shortage caused by fears of extended shelter-in-place rules has caused bidet sales to skyrocket since March. Manufacturer **Tushy** reports seeing its orders hit $1 million a day by March 31—more than 10 times normal. Another manufacturer, **Brondell**, says it sold a bidet on Amazon every two minutes, or about 1,000 units per day, from mid-March to mid-April. And, attachment maker **Hygiene for Health** says its sales doubled during that same period.

The lack of Charmin, Cottonelle, Angel Soft and similar brands has Americans becoming more open-minded to using what is basically a drinking fountain to wash up instead of wiping up. Bidet manufacturers say toilet paper use can drop by up to 80 percent per household. If toilet paper use dropped to zero, roughly 15 million trees would still be around to clean the air, instead of being turned into pulp each year.

Bidets can also help conserve water, according to ***Scientific American***. Creating one roll of toilet paper requires 37 gallons of water. Some bidets, meanwhile, use only one-eighth of a gallon a flush. Toilet paper's carbon footprint also includes hundreds of thousands of tons of chlorine needed to make toilet paper white, massive energy required during the manufacturing process, tons of single-use plastic for packaging, and tens of thousands of gallons of fuel for shipping.

But much of the world is also aware of the benefits. Bidets are common and, in some cases, required in nations such as Italy, Portugal, Japan, Argentina and Venezuela, according to *The Atlantic*. In many places, flushing toilet paper down the drain is illegal due to its impact on plumbing. And, users will say you simply feel cleaner when you're done.

You may have to wait a bit, though—bidet makers report being sold out of their products, with undetermined restock dates. GB

Running on empty. Even once these empty streets are busy again, society will need to make adjustments for the next time a pandemic hits the world. CPETTIT2007/FLICKR

Re-thinking Our Built Environment

What role do planning and design play in a pandemic?

BY ANN FORSYTH

NORMAL LIFE AT HARVARD has been upended by government, university, community and business responses to COVID-19. What role do planning and design have in this kind of pandemic?

Recent reports from London's Imperial College and Harvard Global Health Institute (HGHI) lay out the broad problem. The influential Imperial College report explains that since COVID-19 is a new disease, the general population does not have immunity. Until there is a vaccine—which is expected to be 6 to 18 months away—or a large number of people have been infected and develop immunity, infection rates will be high. The threat, outlined clearly by the HGHI and illustrated by the *Washington Post*, is that hospital and intensive care beds and staff will be overwhelmed. The Imperial College report estimates that with no action, given that COVID-19 is already in the population, over 2 million deaths will occur in the U.S.

That leaves non-pharmaceutical interventions; in the Imperial College report these are termed "mitigation" and "suppression." Mitigation aims to slow the disease using measures such as isolating those who are sick, quarantining household members, and implementing social distancing for those over 70. This would spread out infections and has been used effectively in the past. However, using various assumptions, the report shows that even with a plausible mitigation approach, the U.S. will still need eight times as many intensive care beds as it currently has, with the peak occurring in the summer of 2020.

This leaves suppression—including closing schools and universities and social distancing of the entire population—as our new normal, for a period of months, not weeks. Of course, estimating the effects of various strategies involves many assumptions, but the situation is not a simple one. This is why universities, schools, governments and businesses are changing how they operate. Harvard has gone to online instruction, for example. A key problem is that when suppression is used as an intervention, people do not build up immunity, so suppression needs to be in place until a vaccine is released and immunity built up, or until systems can be put in place to test, track and trace at a massive scale. Countries such as Singapore and South Korea are now exemplars for managing the disease through testing and monitoring, having experienced Severe Acute Respiratory Syndrome (SARS) or Middle East respiratory syndrome (MERS) in past decades. They were prepared for COVID-19. In places without such preparation, suppression is buying time to make

those preparations. A *New York Times* op ed by members of the University of Pennsylvania faculty explains the suppression strategy well.

Additionally, the economic fallout from suppression may endanger the health of the vulnerable: older adults, children, those with preexisting conditions, anyone with a low income, and those otherwise marginalized in society. People may lose their housing, find it harder to access routine health care and prescription medications, and eat less well. Stress is caused by economic hurt as well as uncertainly over the pandemic itself. These are not good times for human health.

What does this mean for urban places? There are very obvious disruptions at the global scale—with grounded flights, required isolation for travelers, and closed borders. More will need to be done internationally to try to stop diseases crossing from animals to humans—a task that is compounded by climate change altering habitats and people moving into previously unsettled areas. But here I want to examine three smaller scales and the built environment.

CITIES AND REGIONS

In the context of COVID-19, some have questioned the future of urban life. This is a bit premature. Metropolitan areas are quite varied in density and character; they range from leafy suburbs to apartment buildings in the core city. It is also important to distinguish between high population densities (counted as people per acre, for example) and crowding (often operationalized as people per room). Singapore has so far avoided the worst of the crisis with widespread testing, isolation, and clear communication. Italy, where suppression is in full force, shows the social solidarity possible in higher density areas—like people singing from their balconies. COVID-19 is emptying out public transportation in many places, but transportation is already in a transition period due to automation. The key health crisis from COVID-19 is likely to appear in more crowed settlements without adequate water supplies and sanitation—in both urban and rural settings—but these have been a focus of public health concern for a long time. While cities will not be eliminated, a long period of suppression may well change patterns of urban life.

NEIGHBORHOODS

With more people working at home, and more deliveries, the neighborhood can provide support, challenge, and delight: support for healthy activities; challenges to stimulate oneself both physically and mentally; and delight in a time of stress. For all except the strictest suppression approaches, people can get out and about for exercise and errands, while still keeping social distance. With gyms closed, meetings going online, and grocery stores limiting numbers of visitors, the outdoors is all the more important. Of course, this assumes people retain their housing as economic conditions worsen—also a key planning and design concern.

Home coping. COVID-19 is forcing most people to stay indoors, where the air focusing on keeping everything sanitary and virus-free.

CREDIT: KZENONISTOCK

Future shock? Architects and contractors may need to rethink design and construction strategies if economic conditions worsen for homeowners.

CREDIT: MRINCREDIBLE/ISTOCK

HOME

People will be home—a lot—with more family members in the same place at the same time. This is not the case for everyone—health professionals, delivery workers, people caring for physical infrastructure, those cleaning and maintaining essential facilities—may be out quite a bit. But for most people, homes also need to provide support, challenge, and delight to maintain physical and mental health. Not all homes are healthy. For example, poor indoor air quality caused by mold or poor ventilation is a substantial health hazard. Physical activity can be carried out indoors but may involve changing behavioral patterns. This is surely a design issue, and again one more critical for those with fewer resources. More than ever, access to the internet, as well as to physical public spaces, are key planning, design and health concerns.

An infectious disease pandemic challenges recent research in the area of healthy places. In the 19th century, the emerging planning and design professions shared a core interest in infectious diseases. Building regulations and sanitation systems were common responses. Infectious diseases are certainly a top concern again today; they are also a continuing issue in places where low incomes lead to crowding, lack of sanitation, and the like.

For the past decades, however, those looking at the intersections of planning, design, and public health have focused less on infectious diseases and more on three other areas: chronic disease, hazards and disasters, and the vulnerable. For chronic diseases—those lasting a year or more—the environment can provide options for healthy behaviors such as physical activity or mental restoration. For hazards—such as climate change—planners and designers need to address flooding, droughts, and climate-led migration. And for the vulnerable, the environment needs to focus on those who are old, young, have preexisting conditions, or have low incomes. The current pandemic brings the question of designing for infectious diseases back to the forefront, however, and raises important questions for future research and practice. GB

REFERENCES:

- *Imperial College:* "Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand."
- *Harvard Global Health Institute:* "U.S. Hospital Capacity."
- *Washington Post:* "Here's one estimate of how much the curve needs to flatten in your community."
- *New York Times:* "The Coronavirus is Here to Stay, So What Happens Next?"
- *Journal of the American Planning Association:* "From Congestion to Sprawl: Planning and Health in Historical Context."

This story originally appeared on the Harvard University Graduate School of Design website. website and is being reprinted by permission. It has been edited for editorial style.

Ann Forsyth is Ruth and Frank Stanton Professor of HUGSD. She is also co-director of Harvard's Healthy Places Design Lab.

New cause. Precedent Furniture has switched from making chairs, beds and sofas to manufacturing protective masks.

Manufacturers Shift Focus to PPEs

HOMEBUILDERS ARE NOT THE ONLY ONES needing to adjust their actions in response to the coronavirus. Manufacturers, such as these partners with home furnishings retailer Room & Board, have also revised operations to help boost the supply of personal protective equipment (PPE):

Open Works of Baltimore, a nonprofit educational and economic development center, has converted its facility to the emergency production of face shields using 3D printers.

American Leather of Dallas, which makes many of Room & Board's recliners and sleeper sofas, is producing masks and gowns for healthcare workers in its Dallas facilities.

Precedent Furniture of Newton, N.C., which makes dozens of the brand's accent chairs, beds and sofas, has switched its production over to protective masks.

ADF of Ladywood, Wisc., which makes **R&B's Arcana wall hooks and magazine stand**, is producing safety shields and separation barriers for service counters in order to protect workers interacting with patients.

Redland Cotton of Moulton, Ala., whose material is used for the ***Sommerville* bedding collection**, is producing masks for the University of Alabama Medical Center.

Valdese Weavers of Valdese, N.C., maker of many popular R&B pillows, is sewing masks for hospitals in North Carolina.

McCreary Modern of Newton, N.C., manufacturer of the **Metro sofa**, has researched and developed two types of masks: One to cover an N95 mask that extends the life of the item, and another mask with a disposable pleated design. The company is making these for Hospice of Catawba County and offers its services to the nation as needed.

Facture Goods of Chicago, known for **the Everly bowls**, raised more than $10,000 for food and PPEs for healthcare workers in the Chicago area through a raffle. This is a personal effort for Aron Fischer of Facture Goods. "My husband is a doctor and many of our friends are nurses, support staff, other doctors and nurses," says Fischer. "I am so worried about healthcare providers. I would like to use that energy to help."

CREDIT: COURTESY OF ROOM & BOARD

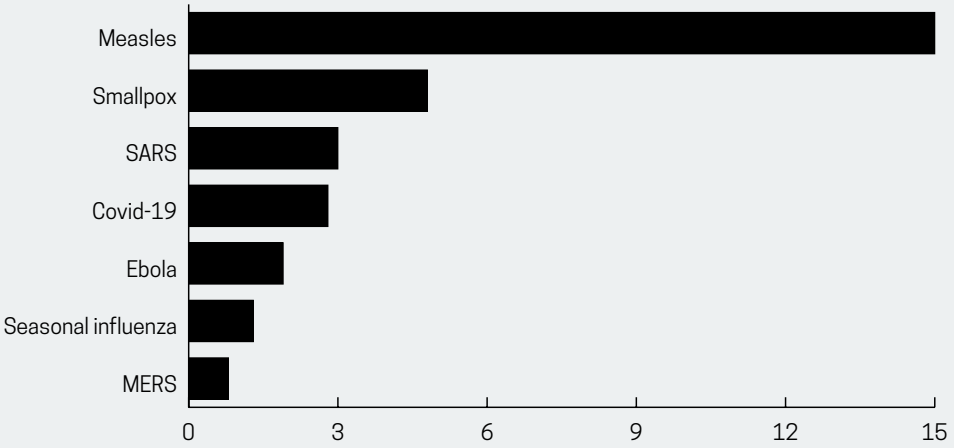
About face. Open Works usually provides tools for business learning. But for now, it creates face shields using 3D printers.

Virus Filtration Requires Overlapping Technologies

Effectively removing viral particles from your home atmosphere is tricky. Success depends on the speed of airflow, filter size, dispersion and a little luck.

How Contagious Is That Disease?

APPROXIMATE REPRODUCTION NUMBER (R0)



SOURCES: WORLD HEALTH ORGANIZATION, CENTERS FOR DISEASE CONTROL, KING SAUD UNIVERSITY, NATURE

Reality check. COVID-19 falls somewhere in the middle of other deadly diseases, in terms of how easy it is to spread.

BY MATT POWER

YOU'RE PROBABLY WONDERING if your HEPA or MERV air filters will protect you and your family from spreading coronavirus around the house.

In short, the answer is "not always." The problem is that no filter removes 100 percent of viral particles, 100 percent of the time. That doesn't mean they don't help. Good filters, especially when tied to your forced-air furnace or central air conditioning, greatly reduce the number of pathogens floating around your home. But anything less than 100 percent is still a risk. According to a report in *Science Daily*, a single virus particle is enough to infect someone—and lead to full-blown symptoms.

Let's look at what are probably the two best filtration technologies for home use, other than ultraviolet light: HEPA and MERV filters.

HEPA—According to American researchers, HEPA filters may not provide adequate protection for all threats because viruses are submicron in size and have small minimum infections doses (MID50). Thus, an appropriate viral challenge "may yield penetration that will lead to infection of personnel."

MERV—Several factors impact how well MERV filters work, including the specific rating of the filter (higher is better). For example, with MERV filters, the speed of

CREDIT: HOME AIR QUALITY GUIDES/FLICKR

Room for improvement. HEPA filters may not provide adequate protection for all threats because viruses are submicron in size and have small minimum infections doses.

Bad air antidote. Broan's new, near-UV wavelength bath lamp can stop tile-destructive mold as well as remove humidity in a room.

Goodbye, Mold and Bacteria

Broan's new bath fan, designed for in-room replacement, marks an innovative first: preventing mold and bacteria with light.

A DECADE OR MORE AGO, *Green Builder* published an article titled "Building Blind," about the many building products in a home that don't last as long as they should. Near the top of the ledger of shame were tile shower enclosures.

Once a tile shower is completed, and the contractor coats the grout with waterproofing silicone for the first and probably the last time. But grout is cementitious. It absorbs water, unless it is recoated every year or so. Homeowners rarely if ever do this. So mold grows. Mildew forms. Grout turns black. Homeowners panic and tear the whole thing out and start over. Tiles that should last 300 years are tossed in the landfill at less than seven years old.

Airflow and Light: Double Defense

Up until now, the best way to halt this wasteful cycle, short of scheduled, yearly visits to seal the tile grout, is to remove humidity from the bath quickly. Bath fans, if used regularly, accomplish this, but grout can still become saturated and provide mold a foothold. The introduction of a mold-killing light to the ceiling unit chassis is a natural evolution.

Lauren Weigel, senior product director for Broan-NuTone, says the company's recently released *SurfaceShield Vital Vio Powered Exhaust Fan* stemmed from a need for greater sanitation in bathrooms. The fan contains two lights, a standard 3500K LED for illumination, and a second antibacterial lamp. Either can be operated independently.

"It's a near-UV wavelength lamp," Weigel explains. "Normal UV can be harmful to the skin, so we kept it in a safe range for people. It will kill mold and bacteria, but not viruses at this point," she notes. It should be noted that Broan-NuTone also offers a LED upgrade grille cover and light module that allow you to upgrade an existing LED to a *SurfaceShield* LED.

"We've designed it so you don't have to crawl around in an attic to install it," Weigel adds. "You can do everything from inside the room. If you have an older, existing fan that's moving 50-70 cfm, but noisy and energy inefficient, this fan can go in the same spot. You cut a slightly larger hole in the ceiling and slide the fan housing in. The duct assembly can be easily attached from inside the housing, no attic access required."

The 110 cfm unit can also be installed piecemeal. In other words, you can install just the fan, or just the LED light, or just the bright white, louver-free grille.

Lamp and Timer Upgrade-Ready

One question sure to come up in this time of the COVID-19 pandemic is whether the light in this unit will kill the virus. The answer is no, but with a caveat. To my knowledge there is no commercial virus-killing ceiling unit for baths available, but the technology may be ready for the marketplace soon. Research is promising on far-ultraviolet C (far-UVC) light, a high frequency UV light said to be safe for humans.

Another question buyers may have is whether the unit can be integrated with timers and sensors. According to Broan-NuTone's tech department, it can be wired to work with the company's *DH100W Dehumidistat* wall control.

In any case, the smart, modular design of the *AR110LVV* means that Broan can easily develop a module that will slide into the installed fan unit, incorporating whatever lamp, sensor or other device is on the cutting edge, for years to come.

airflow through the filter impacts how much of the virus it collects. The example below shows that at slower airspeeds, a MERV 12 filter is much more effective (with "1" being 100% effective).

Another unanswered question about filters is whether virus particles, once trapped, will stay lodged in the filter matrix long enough for them to die naturally. We know, for example, that COVID-19 can survive for several days on some surfaces. If the airflow is suddenly changed, could it dislodge a deadly particle? No one seems to know.

And finally, there's the question of in-room filter performance, versus built-in HVAC systems. Depending on the size of the unit, its rated CADR (clean-air delivery rate) rating (350 is considered good) and the amount of particles captured will vary widely.

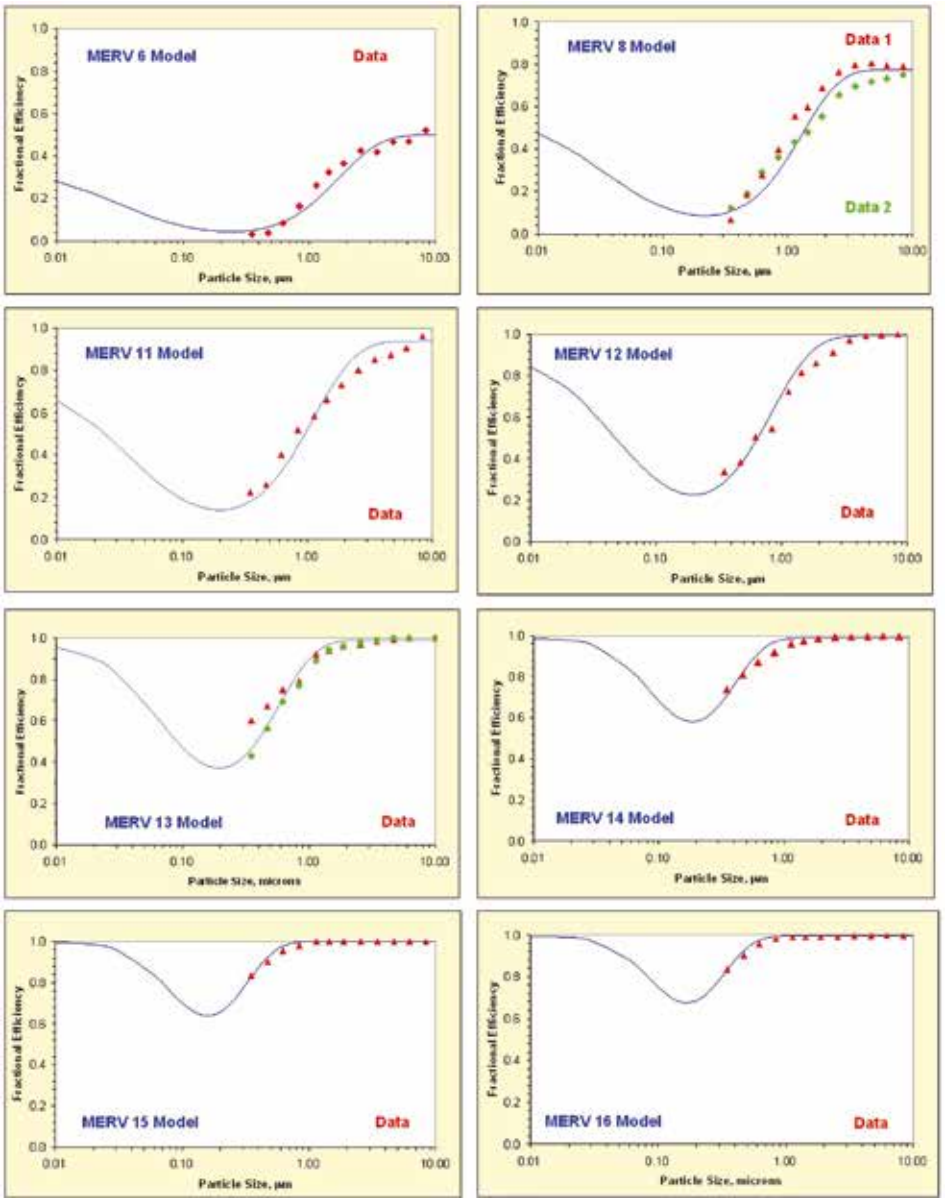
I have tested ionizing type standalone filters and standalone HEPA filters in my own home using an Awair air sensor to measure their effect, and neither seems to have much impact on the amount of particulate in the air. I would definitely recommend an integrated HVAC filter system over an aftermarket product, with the caveat that if you want to isolate a bedroom or sick room, you'll need a way to zone it separately. In any case, filtration alone is not enough to tackle a serious threat like coronavirus. You also need diffusion.

FILTRATION *PLUS* DIFFUSION

Building codes related to indoor air quality aim to maintain *acceptable* indoor air quality, not to scrub away every risky particle. For builders, that typically means meeting the ASHRAE 62.2 ventilation requirement. This results in a certain number of air changes per hour (ACH) in the home.

Newer homes operating under this requirement already have basic air diffusion in place. Many older homes do not. It's key that this capability be used in combination with filtration. In other words, by constantly diffusing the air while you filter it results in fewer particles to capture. This gives filters a higher chance of catching virions that could make you sick. A good product candidate for ventilating in this manner would be one of Panasonic's small *FV-04VE1* energy recovery ventilator units. These run continuously, replacing stale air with fresh air, although exhaust-only bath fans or range hoods can be used to keep air moving.

No matter how good your air diffusion and defiltration, continue to practice sanitation and isolation protocols. Don't let a single rogue virion that lands invisibly on a surface ruin your week, or your life.



CREDIT: NAFA

Speed matters. Different types of MERV filters follow a general, identical path toward powerful job performance.

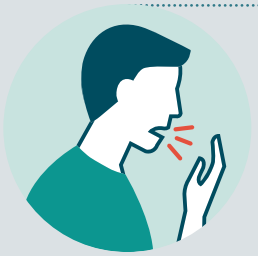
FOR MORE INFORMATION:

- *Science Daily: "One Virus Particle is Enough to Cause Infectious Diseases"*
- *Research Gate: "Viral Penetration of High Efficiency Particulate Air (HEPA) Filters"*
- *U.S. Department of Energy: "ASHRAE Standard 62.2. Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings"*
- *International Business Links: "Solution & Relief to the COVID-19 Pandemic"*

COVID-19: Far More Infectious Than You Think

BY ERIN S. BROMAGE, PH.D.

Here's science-based information about how easily coronavirus spreads:



A COUGH: A single cough releases about 3,000 droplets and droplets travel at 50 miles per hour. Most droplets are large and fall quickly, thanks to gravity, but many do stay in the air and can travel across a room in a few seconds.

A SNEEZE: A single sneeze releases about 30,000 droplets traveling at up to 200 mph. Most droplets are small and travel great distances—easily across a room.

If a person is infected, the droplets in a single cough or sneeze may contain as many as 200 million virus particles which can all be dispersed into the environment around them

A BREATH: A single breath releases 50 to 5,000 droplets. Most of these droplets are low velocity and fall to the ground quickly. There are even fewer droplets released through nose breathing. More importantly: Due to the lack of exhalation force with a breath, viral particles from the lower respiratory areas are not expelled.

Unlike sneezing and coughing, which release huge amounts of viral material, the respiratory droplets released from breathing only contain low levels of the virus. We don't yet have a number for SARS-CoV-2—the strain of coronavirus that causes COVID-19—but we can use influenza as a guide. We know that a person infected with influenza releases about 3-20 virus RNA copies per minute of breathing.

Remember the formula: Successful Infection = Exposure to Virus x Time

IF A PERSON COUGHS OR SNEEZES, those 200 million viral particles go everywhere. Some of the virus hangs in the air, some falls into surfaces, most falls to the ground. So, for example, if you are face-to-face with a person having a conversation, and that person sneezes or coughs straight at you, it's pretty easy to see how it is possible to inhale 1,000 virus particles and become infected.

But if that cough or sneeze was not directed at you, some infected droplets—the smallest of small—can hang in the air for a few minutes, filling every corner of a modest-sized room with infectious viral particles. All you have to do is enter that room within a few minutes of the cough/sneeze and take a few breaths, and you have potentially received enough virus to establish an infection. With general breathing—in which roughly 20 copies per minute are released into the environment—things are less severe, but you're not in the clear. Even if every virus particle ended up in your lungs, you would need 1,000 copies divided by 20 copies per minute = 50 minutes.

Speaking increases the release of respiratory droplets about 10 fold; more or less 200 copies of virus per minute. Again, assuming every virus is inhaled, it would take roughly five minutes of speaking face-to-face to receive the required dose.

The Exposure to Virus x Time formula is the basis of contact tracing. Anyone you spend greater than 10 minutes with in a face-to-face situation is potentially infected. Anyone who shares a space with you (say an office) for an extended period is potentially infected. This is also why it is critical for people who are symptomatic to stay home. Your sneezes and your coughs expel so much virus that you can infect a whole room of people.

Erin S. Bromage, Ph.D., is an Associate Professor of Biology at the University of Massachusetts Dartmouth. He graduated from the School of Veterinary and Biomedical Sciences James Cook University, Australia, where his research focused on the epidemiology of, and immunity to, infectious disease in animals.

Modern living. Wayne Turett's Passive House was designed to be an example of energy-saving technologies at their finest. CREDIT: COURTESY OF TURETT COLLABORATIVE

Saved by (Net) Zero

When people stay at home, energy efficiency is a must. Builder Wayne Turett came to that conclusion several years ago.

BY GREEN BUILDER STAFF

YOU WOULDN'T THINK there would be much of a link between COVID-19 and the way a house is built. But spend a couple months inside a home with an outdated ventilation system or decaying windows and you might change your mind—both in terms of comfort, as the weather warms, and finances, when you get your power bills.

Coronavirus, meet Net Zero. A well-planned, energy efficient house can make the next stay-at-home scenario (and it will happen again, one day or another) tolerable. Maybe even fun.

That brings us to architect Wayne Turett, principal of the Turett Collaborative, a New York City-based residential architecture and interior design firm. Concerned about over consumption in the post-industrial modern world and how it affects our ability to maintain a healthy planet, Turett wanted not only to design, but to experience for himself just how well energy-efficient technologies could work.

"A few years ago I started to see more information on Passive Houses in a number of architectural journals," Turett says on his website at www.turettarch.com. "The concept was simple: design a house that was very well insulated and sealed, allowing very little infiltration that would reduce the demand for heating and cooling. That was the way I understood it. Perhaps I oversimplified it in my mind. Unlike LEED, which takes many other factors in consideration, Passive House was a much more simple recipe for a very efficient house."

After three-years of researching, sketching and planning, he decided to embark upon creating and living in a passive home of his own. His dream was realized in 2018 as a carbon neutral design that fuses his modern aesthetic with an historical, barn-style exterior, more in keeping with the village of Greenport, N.Y., on the North Fork of Long Island.

As is true to the Passive House movement and standards, this modern home with

Sun guard. Roof overhangs and directional positioning keep the deck and living room from getting too much sun—and therefore be too hot—during summer.

CREDIT: COURTESY OF TURETT COLLABORATIVE

CREDIT: COURTESY OF TURETT COLLABORATIVE

Plain gain. Rooms throughout the house, such as the kitchen, were kept white to create a contemporary feel and help reflect light for better efficiency.

interior spaces that recall urban loft living seeks to maintain comfortable temperatures year-round while requiring minimal energy and expenditure for heating or air conditioning. Air coming into the passive home is filtered, allowing all of it coming into the home to be clean—free of pollens and particulates. In addition, a Passive House consumes about 90 percent less heating energy than existing buildings and 75 percent less energy than average new construction.

"Greenport is more than just an oasis for my family," he explains. "It is a living model for clients and meant to inspire others."

MORE THAN MEETS THE EYE

Despite costing a little more to build, the results of living in a Passive House will more than pay for itself in energy savings and helping the environment, Turett notes. Additionally, the air quality inside is a very high standard of luxury.

As noted, Turett spent time deciding exactly what he wanted in a passive home. It's advice he readily gives to others. "We all know that it is typical to think of energy-efficient houses as being somewhat dark, and stuffy, but it doesn't have to be that way," he notes on his website. "With proper care taken during the design phase, your Passive House can be as light-filled and airy as a conventional contemporary house, with the added benefit of no expensive heating and cooling bills."

He's living in his proof. While to the casual observer Turett's Passive House doesn't look different from any other well-designed

contemporary house, there's a difference in the way it is built and performs. A recent Home Energy Rating System (HERS) analysis of the 2,400-plus-square-foot Greenport house confirms an estimated annual heating and cooling cost of just over $1,700 a year. To put this into perspective, a 900-square-foot NYC apartment costs about $1,400 a year just to cool and use the lights. The Greenport Passive House is not only more efficient than the HERS reference home, but has an annual savings of $3,645 over the HERS reference home numbers.

With sustainable, lower energy requirements, the Passive House approach makes possible the construction of net-zero energy buildings that rely little or not at all on fossil energy sources.

CREDIT: COURTESY OF TURETT COLLABORATIVE

Breath of fresh air. Air throughout the home is filtered to make it free of pollens and particulates.

HAVE IT YOUR WAY

According to Turett, there were three key elements to consider when conceiving of his Passive House: the envelope, which had to be completely sealed so that there was no leakage of air; the insulation to ensure that heat would not escape nor cold air would enter; and added elements, such as roof overhangs, that protect the house from receiving too much sunlight in the summer. The house also has exhaust ducts in the kitchen and bathroom, triple-glazed windows, and energy-recovery-ventilation which brings in and takes out air. The exterior is shiplapped gray cedar and cement, and the roof is aluminum. Inside, Turett kept the walls white, and the furnishings clean-lined and contemporary, with a neutral color scheme, light woods and white upholstery.

CREDIT: COURTESY OF TURETT COLLABORATIVE

Heat regulator. Triple-paned windows in the bathrooms and elsewhere help stabilize temperature without using excess energy.

Turett also acted as his own general contractor. While the investment costs required for construction exceeded the traditional building costs, the results of creating an all-electric home which is heated and cooled with a duct mini-split system and aided by an ERV, allows the home to operate with very little energy for heating or cooling—thus resulting in lower monthly energy bills. The high quality of insulation, in combination with a proprietary sheathing taped to form the air barrier, allow for an airtight building envelope. Even the metal roof plays a role in the efficiency of the structure—in winter, natural elements such as snow actually contribute to keeping the home insulated.

The entire design of this two-story home was thoughtfully created to not only be energy efficient, but to make the most of interior and exterior spaces. The main living spaces—the combined kitchen, dining, living rooms and porch—were intentionally located upstairs to soak up water views, while cathedral ceilings in the great room contribute to an open and airy feeling reminiscent of a more modern and urban loft-like experience. Downstairs, an outdoor shower helps smooth the transition from the sandy shore to the three-bedroom, two bath space on the ground floor.

Turett notes that the popularity of Passive Houses, which have been on the market since the 1990s, is on the rise. That's a good thing, given how much time people are now spending at home, for work or other reasons. "[Homes] don't have to be big, leaky and energy inefficient," he told *The Southampton Press*. "They can be very efficient and very comfortable. They can save a lot of energy. They can save a lot of the environment." **GB**

Green housing boom? Net-zero homes, such as this Thrive Home Builders creation in Denver, Colo., are becoming more popular due to an increasingly pro-green attitude by builders, sellers and buyers. Expect even more in years to come.

CREDIT: MOSS PHOTOGRAPHY

Maverick No More

The rise of net zero housing will likely accelerate in wake of the pandemic.

BY GREEN BUILDER STAFF

THE NET ZERO energy building (NZEB) movement has hit critical mass. After decades of being considered a fringe goal and showcased in the media as maverick, net zero housing has earned its place in the mainstream. It's slated to become the way all homes will be built in the near future.

A number of factors are driving this movement. They include new, cost-effective technologies and ratcheted codes are driving demand for NZEBs; a doubling of the built environment by 2050, with aggressive clean energy targets being set by governments, corporations, and communities; and building professionals using sustainability, energy efficiency, net zero building and solar as differentiators.

Also, consumers are playing a central role in purchasing, specifying green products up to 70 percent of the time—even in categories such as insulation and solar that they never used to touch. Meanwhile, creative financing options are making it possible for people to buy those homes.

All of those elements support an even bigger ideal: The built environment can have a tremendous impact on reducing greenhouse gas (GHG) emissions. According to environmental policy firm Energy Innovation, if all buildings were net zero and the industrial processes were adapted to net zero, then the United States could reduce its GHG emissions by more than 50 percent.

Ed Mazria, internationally esteemed architect and founder of Architecture 2030, finds a parallel between global emissions and U.S. GHG emissions. He makes the case that the built environment is the most-promising sector to reduce GHG emissions enough to keep global warming below the 2°C limit set during the 2015 Paris United Nations Framework Convention on Climate Change.

If so, the built environment is on its way. In the United States and Canada, the number of net zero residential structures from 2017 to 2018 grew by 59 percent, according to COGNITION Smart Data. In addition, more than 22,000 single-family and multifamily projects that are in design, construction, or operation.

It's expected that the global market for net zero energy structures will explode to $78.8 billion by 2025 due to innovation in high-performance products, renewable energy, and automation technologies, and corresponding advancements in codes and policy—growth irrespective of location, climate and political jurisdiction. Time will tell.

Builders/Developers with 10+ Projects

	PROJECTS	STATE/PROVINCE
BrightBuilt Home	78	ME
Greenhill Contracting Inc.	39	NY
BrightLeaf Homes	27	IL
Clifton View Homes	26	WA
Mandalay Homes Inc.	23	AZ
Palo Duro Homes, Inc	20	NM
Decker Homes, Inc	17	OH
Latitude 38 LLC	15	VA
BPC Green Builders, Inc	15	CT
Charles Thomas Homes	14	NE

Westward no. Contrary to popular belief, only three of the nation's busiest net zero homebuilders are in the Western United States.

Buyer's optimism. Almost half of the consumers who planned to buy a house before the coronavirus pandemic are sticking with their plans now that COVID-19 is here. CREDIT: ADENE SANCHEZ/ISTOCK

Home-buyers Shift Priorities

Pandemic or no, people still want to buy homes—but they expect more health and safety for their money.

BY SARA GUTTENBERG AND DIGITAL EDGE STAFF

MOST ECONOMISTS AGREE that we're heading for a recession. Some project a "short but sharp" event, with a steep tumble in 2Q 20 and a quick rebound in subsequent quarters. Others forecast a longer downturn, with more dramatic impacts felt throughout the rest of the year.

The housing market has proven to be somewhat resilient to pandemics—when the stock market is suffering, investors look for safer places to put their money, such as bonds and real estate.

Prior to the coronavirus outbreak, the housing market was expected to be vibrant in 2020—while supply is short, demand has been high due to low unemployment, solid wage growth, low mortgage rates, and high property confidence. But this pandemic is different—it's the first one that can be followed online, and news of COVID-19, good or bad, real or fake, is easier to come by. That will contribute to a projected 35 percent drop in sales this quarter, and a decades-low 4 million home sales, according to financial research firm Capital Economics (CE). The stay-at-home mandate and skyrocketing unemployment since mid-March are likely to also have a negative impact on the housing market for months to come, CE notes.

CREDIT: ULZA/ISTOCK

Enjoying clean air. Exceptional indoor air quality will be one of the first things consumers expect when buying a home, making ventilation systems one of the first things on builders' "must include" lists.

Not everyone agrees with the dire numbers. In a survey by Homes.com, nearly half of its 1,000 respondents who planned to buy a home before the pandemic are continuing the effort. Seventy-five percent of those conducting their house hunting online want to continue, coronavirus or not. Sellers are in a similar position, with close to half who started selling before COVID-19 keeping their homes on the market. Also, only 1 in 4 report suffering from a lack of traffic. This finding is echoed by a similar

report from Rise Home Design, which finds no decrease, and in some cases, an increase in foot traffic—a sign that people are doing more research and being more careful about their investments.

WHAT DO CONSUMERS WANT?

In a recent builder survey conducted by Green Builder Media, nearly one-third of respondents noted that consumer interests, expectations and requirements are changing, specifically in areas such as Health and Wellness, Resiliency and Self-Sufficiency, and Connected Living.

These evolving consumer expectations will place new demands on building professionals and manufacturers, spurring the development of innovative products, systems and technologies that help us adapt to the new realities of a post-pandemic world.

Good indoor air quality will become a necessity for buyers, driving demand for proactive indoor air quality systems with monitors and sensors that tie into ventilation systems to ensure fresh air exchange and purification.

Connected living solutions will proliferate to match the surge in home healthcare and telemedicine, and new smart home technologies will be developed in response to the evolution in how and where we work.

Look for an upsurge in voice-enabled and touchless products, like faucets, bidets, locks, light switches, TVs, and appliances, as well as anti-microbial surfaces and materials to keep our spaces germ-free.

We can also expect increased digitization of certain building industry services, such as virtual inspections, appraisals and permitting, 3D home showings, and digital notarization. Coronavirus has also made shoppers less picky: The National Association of Realtors says that 24 percent of buyers are now willing to purchase a home sight unseen (that number increases to 30 percent for millennials). **GB**

RESOURCES:

- *Green Builder Media:* "Coronavirus and the Housing Industry"
- *Homes.com:* "How Homebuyers and Sellers are Feeling With the Current Real Estate Market."
- *Rise Home Design:* "Homeowner Outlook Amid the COVID-19 Outbreak."

Waiting patiently. Only 25 percent of Realtors and other home sellers say fewer people are coming to see homes because of the pandemic.

CREDIT: MADHOURSE/ISTOCK

The Path Ahead

BY SARA GUTTENBERG

AS THE ECONOMY OPENS UP, questions and concerns abound how the Coronavirus pandemic will impact the built environment, and how the industry will respond.

In the first several weeks of the pandemic, general consumer sentiment was negative and fearful, as people were worried about getting sick, stopping the spread, and losing their jobs and health insurance. Over the next few weeks, however, sentiment became much more positive as people focused on creative ways to relieve stress. Hope was visibly replacing fear.

What does this mean for the construction industry? Plenty of positives, if builders push the right consumer buttons.

According to Devyn Bachman, manager of research John Burns Real Estate Consulting, housing sales are down roughly 65 percent but positive news is coming out of the new home market, particularly for builders who are targeting the first time and entry level buyers. She points out that a growing number of renters are leaving their apartments and purchasing new homes.

Many of those soon-to-be ex-renters are millennials who are being drawn to the market by low mortgage rates, according to Nationwide Senior Economist Ben Ayers.

"[This] should drive a rebound in housing activity later this year and into 2021," he notes. "With the inventory for existing homes expected to remain tight, there will be the opportunity for strong gains in new home sales again."

Based on the rebound potential, builders seem to be in the mood for moderated sanguinity. In a recent builder survey conducted by Green Builder Media, approximately 75 percent of respondents reported that they believe their businesses will be impacted in the short term but fine in the long term. Five percent reported that they weren't experiencing any slowdown at all.

Interestingly, only 37 percent of builders reported that their home buyers are putting orders and purchases on hold.

As we prepare to reopen the economy, the time is perfect to take the opportunity to reimagine the way that we live in our homes and buildings. The question is whether we will have the ingenuity and political will to reset the way that we design, construct and interact with the built environment.

MARIPOSA MEADOWS

Exterior Motives

Don't be fooled by the tranquil appearance of the VISION House at Mariposa Meadows—this is a powerhouse built to withstand the most extreme weather.

BY CATI O'KEEFE

SPRING FINALLY COMES TO THE MEADOW. The U.S. Forest Service truck idles at the gate while a ranger unlocks the metal bars that have blocked traffic from the forest road during the treacherous winter season. It is this way every year. From the first real snowfall in November through the end of May, the road to Mariposa Meadows, deep within the San Juan mountains of Colorado near Telluride, remains closed.

A few miles down the road, quietly under blankets of snow, the three super high-performance units that make up the VISION House at Mariposa Meadows complex stand serene and cozy. Set for completion in the short work window of the next four to five months of amenable weather, now is their moment to shine.

BUILDING SCIENCE WHEN IT REALLY COUNTS

Mariposa Meadows will debut this year, and its timing could not be more perfect. As the world grapples with coronavirus and climate change, interest in living more sustainably has heightened. "On social media, news, blogs and forums, people are actively talking about the coronavirus pandemic's ironic positive environmental impact," says Sara Gutterman, Green Builder Media CEO and co-owner of the project. "We've seen reports of measurable improvements in air and water quality over the past few weeks because of the shutdown of business, industry and transportation across the globe." (See "Consumers Want Resilient Houses and Self-Sufficient Lifestyles" chart, page 52.)

While the country—including the building industry—needs to get back to business, is it possible that new sustainable paradigms will emerge, allowing us to house people in smarter ways? Could we indeed have the best of both worlds—a sustainable environment *and* housing that offers

human-centric design, resiliency, energy efficiency and comfort?

Ron Jones says we can. In fact, he has been saying this throughout his decades of work as a sustainable architectural designer and builder. Jones is the co-owner, designer and builder of Mariposa Meadows, which is in many ways his most ambitious project to date. But even with its lofty goals of being off-grid, self-sufficient, resilient and carbon neutral, the building concepts and best practices of this project can be used in any type of high-performance build.

Nowhere is this more clearly demonstrated than in the building science and products behind the project's exterior and building envelopes.

"When we began visualizing the initial phase of development at Mariposa Meadows, we embraced the challenges of building on a remote site at an elevation of 10,400 feet, on steep, rocky terrain in the midst of an aspen forest," Jones says. "And we knew that to execute a successful project, one capable of matching the sometimes extreme conditions there, our design approach and product selections would be of paramount importance."

As the diagram points out, Jones has addressed each exterior aspect by carefully selecting products for their resilience, energy efficiency and beauty.

"Durability is paramount," Jones emphasizes. "We chose everything for a challenging, remote location. In fact, I can't pull out one product and say it is the weak link. Everything selected is best of class—every single component."

So as Jones returns to resume work on the buildings, the first thing he does is check to see how they weathered the brutal winter. Let's walk with him around these extraordinary buildings to see how the design, products, building science and systems coexist in a perfectly balanced ecosystem.

BUILDING FROM A STRONG FOUNDATION

The project's three structures—Aspen Cabin, Atrium Duet and Studio—feature foundations constructed from insulated concrete forms (ICFs), and walls and roofs made from structural insulated panels (SIPs) placed on a carefully prepared site.

"Preparation of the building pads involved considerable effort," Jones says. "[This is] due not only to the topography but also to the geology, since a typical thin layer of soil covered extensive areas of deep-running veins of rock that necessitated a good deal of over-excavation followed by fill and compaction to allow for foundation work, plumbing rough-ins and buried utilities."

The slabs feature four inches of insulation underneath them. "The insulation on the foundations and slabs is incredible," Jones says.

The Nudura ICFs consist of rigid polystyrene forms filled with concrete, which is reinforced with rebar. The forms can be adjusted to accommodate desired wall thickness.

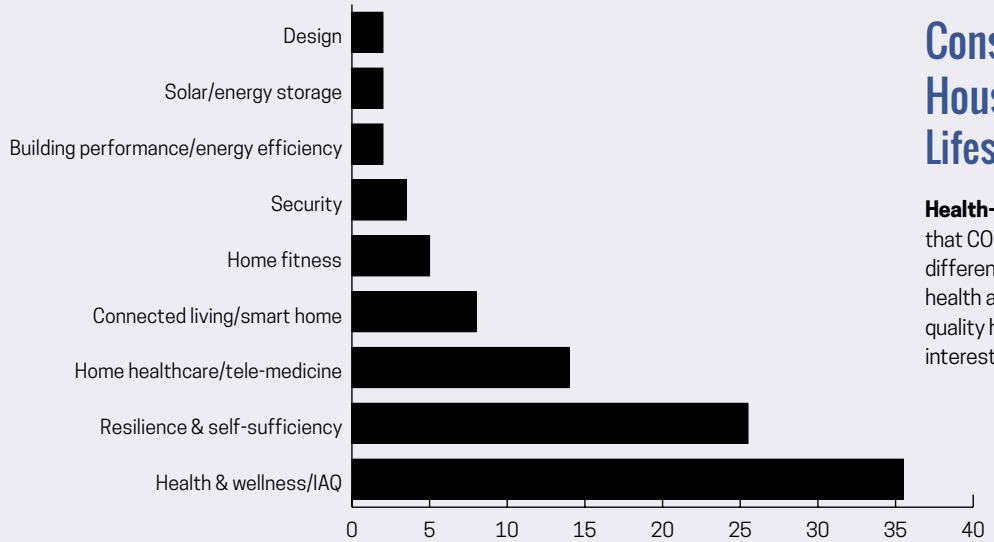
Mariposa Meadows at a Glance

SURROUNDED BY MILLIONS of acres of national forest in the San Juan Mountains of Colorado near Telluride, the VISION House at Mariposa Meadows unites extraordinary design, extreme performance, innovative products and intelligent technology.

The VISION House at Mariposa Meadows features a wide spectrum of sustainable solutions, from high-performance building envelope systems to renewables to enabling technologies, extending into areas such as wildfire risk mitigation, intelligent water, waste reduction, clean mobility solutions, on-site food production and ecosystem protection.

In addition, on-site testing, research and performance monitoring activities, Mariposa Meadows will be used as a destination location for a variety of thought leadership events, with the goal of educating visitors about advanced sustainable living solutions.

While the vision for Mariposa Meadows is big, the footprint is small. As with every good building project, the team is doing its best to respect the privacy and solitude of the neighbors—namely, the moose, elk and beaver.



Consumers Want Resilient Houses and Self-Sufficient Lifestyles

Health-minded. COGNITION Smart Data reveals that COVID-19 is changing how people think about different aspects of living and home. Demand for health and wellness, and excellent indoor air quality has skyrocketed, followed by a burgeoning interest in resiliency and self-sufficiency.

Well stacked. The VISION House at Mariposa Meadows consists of three net-zero energy, high-performance buildings, which will serve as an off-grid sustainability center in the Rocky Mountains of Colorado.

CREDIT: GREAT BUILDER MEDIA

triple-glazed glass offers R-10 insulation. "I am so thrilled to have these windows and have the highest praise for the product," Jones adds. "They are beautiful, functional, and magnificent—and one of the most-appropriate components of the building envelope inside and out."

Also part of the thermal story, the Assa Abloy insulated steel entry doors and the Clopay garage doors add functionality to the spaces without sacrificing performance. "The R-15 garage door has a 100-mile-an-hour wind-load rating, which is important for durability and energy efficiency on a wind-whipped site," Jones notes. "In addition, it helps make the garage with its Uponor radiant heating system operational year-round, while also providing security and fire protection."

"I'm a firm believer in ICFs," Jones says. "One of the main advantages is that a small crew can handle quite a bit of material." Using ICFs instead of a full concrete structure also reduces the total amount of concrete required—a good thing, since the product is expensive and difficult to deliver to a remote site such as Mariposa Meadows.

Walls constructed from SIPs provided by the Structural Insulated Panel Association (SIPA) and Big Sky top the super-insulated foundation. "Working with SIPs required a learning curve, says Jones. "There's a simple but detailed procedure to prepare. It also takes more machinery than conventional construction, but if you have the equipment and an experienced crew available, it can really speed up the building process."

When Jones enters the buildings, he is not surprised at the temperature inside. "SIPS are so amazing," he explains. "You can go up there first thing in the morning when the temperature is in single digits or zero outside, and inside—where there is no mechanical heat, just solar gain and an insulated envelope—the lowest I've seen the temperature is 40 degrees F."

Jones specified that DuPont's *Tyvek DrainWrap* and *FlexWrap* products provide air and water resistance and vapor permeability. The *DrainWrap*, in particular, offers a grooved surface for water drainage, which is a good choice to use with the fiber cement siding.

Jones is quick to point out that while the *DrainWrap*-covered SIPs and the ICF foundation are the workhorse products in this collection of resilient buildings, they wouldn't function correctly without complementary choices for the openings.

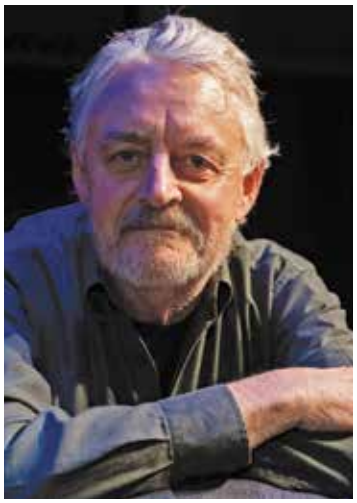
OPENINGS THAT ADD VALUE

Jones chose EuroLine's 4700 Series *ThermoPlus* windows and patio doors for two reasons: their aesthetic, and their performance. He didn't quite bank on the third attribute. "It took seven good men—and me—to move the patio door alone," Jones recalls. "Of the thousands of high-performance fenestrations I have installed, these windows are the heaviest."

The product's heft adds to its durability and resilience, and the

Great panes. Each home's EuroLine *ThermoPlus* windows look good and maintain internal temperature even better, thanks to R-10 insulated triple-pane glass.

CREDIT: GREAT BUILDER MEDIA



"Durability is paramount. We chose everything for a remote location. In fact, I can't pull out one product and say it is the weak link. Everything selected is best of class—every single thing."
–RON JONES, OWNER, DESIGNER, BUILDER

IMPENETRABLE ROOFING AND SIDING

Jones and Gutterman shared a concern for fire resistance and durability when they were choosing the siding and roof. "Standing seam metal roofing was a no-brainer," says Jones. While they selected the Fabral roofing for its exceptional resilience, they also designed the project so that no penetrations would go through the product.

"There are no hollow soffits on the houses because sparks can come in through soffits," Jones explains. "We also vented everything out through the sides of the houses through the gables. The [energy recovery ventilation], plumbing, exhaust fans and vents all go out through the walls."

Jones did this partly because of the heavy snow loads the houses will bear. With no penetrations on the 9:12-pitch roofs, the snow slides off the roof, and what snow remains will not infiltrate the house. The impenetrable roof also provides protection against embers should a forest fire occur.

For a similar reason, Jones opted for James Hardie fiber cement siding and trim. The vertical board-and-batten product is fire resistant and durable, while its solid color qualities and dimensional stability eliminates cracking or peeling. James Hardie offers the siding prefinished with ColorPlus technology, which gave Jones 25 colors to choose from and the promise of low maintenance even at high elevation with its severe weather and with strong ultraviolet rays.

The masonry veneer wainscoting by Creative Mines is a sustainable product that uses natural pumice pozzolan in its 70 percent post-industrial recycled content, replacing smokestack-produced fly ash. The application of this stone will be part of the next few months' work, along with the expansive fire-resistant, low-maintenance Trex hardscaping in the outdoor living areas, once the buildings have been completely finished.

Jones is particularly excited about these important finishing touches, as they will bring these super-insulated structures to life, emphasizing that beauty, sanctuary, livability and comfort are the hallmarks of home. Follow along as we highlight these portions of the exterior build in upcoming articles. In the meantime, check out the VISION House at Mariposa Meadows story online for more details about the project tenets, building science and innovative products. **GB**

Resources:

- *Green Builder Media:* "How to Run Electric Through SIPS"
- *Green Builder Media:* "Mariposa Meadows: Live Life Free"
- *SIPA:* "Building With SIPs: Need to Know"
- *SIPA:* "Designing With SIPs: Design Considerations"

High-Performance Products Meet Extreme Climate

Extra protection. Tyvek *DrainWrap* from DuPont combines air and water resistance and vapor permeability with a vertically grooved surface designed to provide enhanced drainage and protect against wind-driven rain.

Right roofing. Metal standing seam roofing from Fabral comes with a Class A fire rating, and is the obvious material choice for a remote, high-altitude location.

Resilient decking. Outdoor living areas that tie the buildings together will be built this summer using Trex high-performance wood-alternative decking and railing, made from 95 percent recycled materials in an eco-friendly manufacturing process.

Durable cladding. Prefinished fiber cement siding panels, trim and soffits from James Hardie ensure that the entire exterior is protected with a fire-resistant cladding that also enhances the architectural style of the buildings.

Impenetrable entry. Assa Abloy's steel exterior doors with offer maximum security and dependability on a remote site. The product has custom size and style options.

Finishing touch. Creative Mines' masonry veneer in *Tortoiseshell Craft Foothill Rubble* is a sustainable product that uses natural pumice pozzolan in its 70 percent post-industrial recycled content, replacing smokestack-produced fly ash.

Panasonic

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There's no place like a healthy home

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THE COSMOS™ HEALTHY HOME BUILDER ADVANTAGE

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- Connect to compatible Panasonic ventilation products using open IoT technology
- Comply with code, reduce callbacks & minimize litigation risk
- Address buyer health concerns related to poor indoor air quality
- Build your brand & reputation as a healthy home builder
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2020 Editors' Choice
GREEN BUILDER
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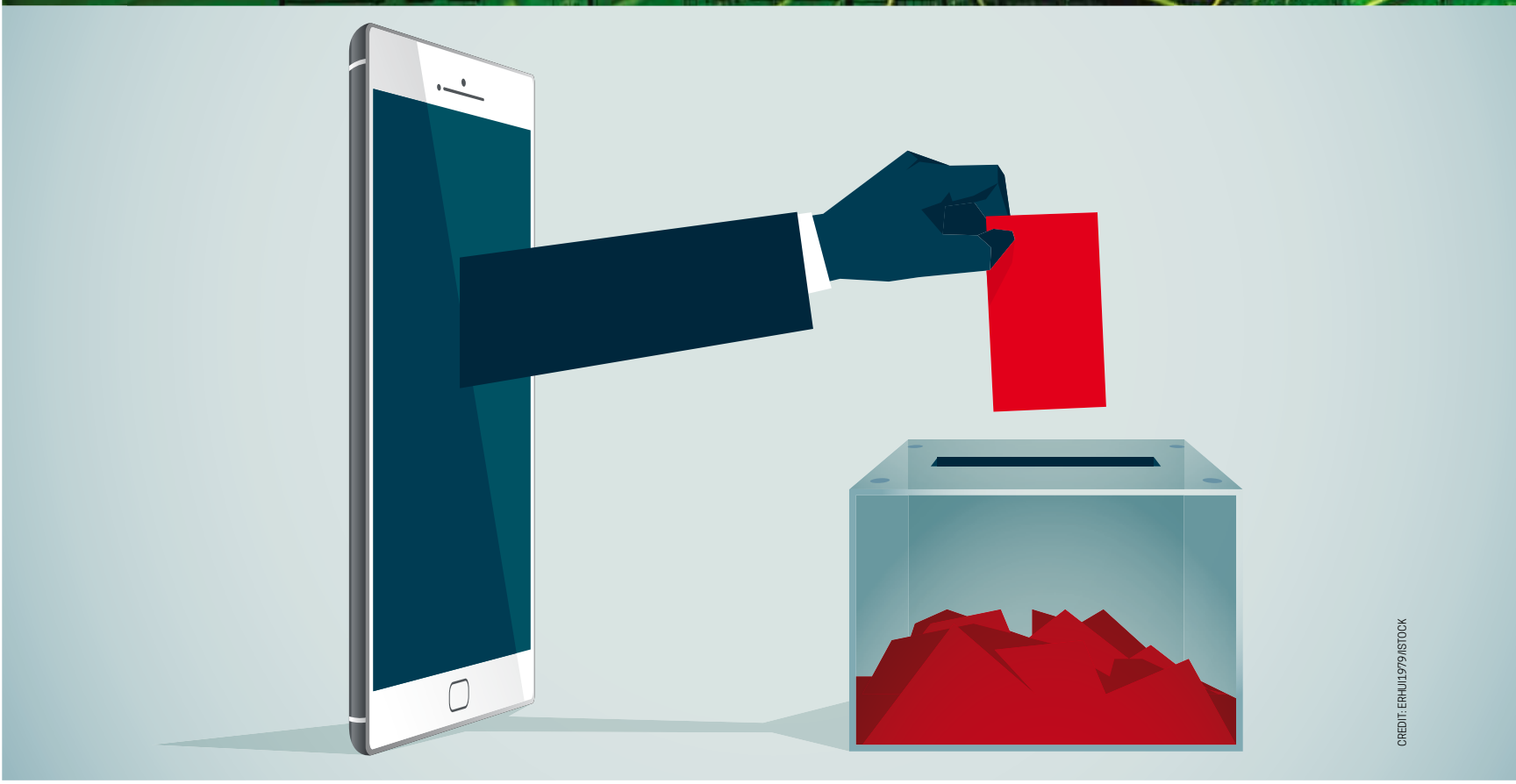
PRODUCTS

CODE ARENA

The Latest Rules, Regulations and Codes Impacting Sustainable Construction



CREDIT: ERHUI1979/ISTOCK

Onward With Online Voting

Is e-voting helpful or harmful to code development? Eight ICC shareholders offer their views.

BY MIKE COLLIGNON

IN OUR LAST ARTICLE, we detailed the 2021 IECC preliminary voting results. The outcome certainly generated a lot of passionate response. Starting in mid-January, the letters started pouring in to the International Code Council (ICC) from stakeholders such as the Leading Builders of America, AIA, NAHB, NASEO, NEMA and state and local code officials.

As of press time, **the ICC had received 19 letters** voicing their opinions on the outcome and process. Some of the letters disputed the eligibility of the registered voters and alleged voting irregularities. After a third-party independent audit, **the ICC announced there were no discrepancies found** and the results were forwarded to the Validation Committee for their review.

The ICC details the next steps as: "Once that committee makes a determination, their recommendations will go before the Code Council Board of Directors, which will issue a final ruling on the Group B code changes. The Code Council will then issue a public report on the proceedings." (Editor's note: **Final results** were released on April 10, 2020.)

Regardless of when the process is completed, there is still a philosophical discussion taking place about the electronic voting process. Has it been unfairly coerced? Does it provide a benefit to those governmental voting members who cannot attend the hearings in-person? Is increased engagement from governmental voting members a positive or negative thing?

The ICC will grapple with this discussion in the months ahead. We thought it might be helpful to survey various participants in the code development process. Each respondent received the following two questions, and were given a target of 200 words to reply. If responses were edited, it was only for length or typos and edits received the consent of the respondent.

Is the electronic (i.e., online) voting process helpful or harmful to the code development process? Why?

SHARON BONESTEEL
Building Codes Program Manager, Salt River Project

I have been in the code business a long time, and things certainly have changed over the years. There are things that I really miss about the old ways. You needed to be at the Code Development Hearings in person; there was no electronic voting. Back then, we debated changes in person, groups of people in the back of the room working out revisions to bring consensus from various parties. We worked things out together, right there. You could disagree with someone on a code change, and still go out for a drink together afterwards.

The cdpAccess system at ICC was designed to allow for transition into the next century, a time when we communicated more via email than in person. My transition has been fraught with frustration and discontent. I want to work a resolution out in person.

So, having reminisced about the old days, and moaned about the new days, where do I stand? Buckle up kids, it's a new world out there. We need to learn to work together with the new technology. You can still PICK UP THE PHONE. CALL THE PERSON AND TALK. Yup, the old way still works. We just need to use the new technology to do it.

JOE CAIN, P.E.
Director of Codes & Standards
Solar Energy Industries Association (SEIA)

Today, both. The Online Governmental Consensus Vote (OGCV) is helpful when it works as intended; harmful when abused. The original intent was to ensure those who are charged with adopting, implementing, interpreting, and enforcing the I-codes are the ones who vote, and to ensure those with constrained travel budgets can participate. During one critical IRC proposal, 117 votes were cast at the PC Hearings to set the agenda for OGCV; yet near the end of the IECC agenda, only 30 voters remained at the hearings. On Feb. 14, ICC reported "Over 240,000 votes were cast at the combined PCH and OGCV." A vast majority of OGCV-eligible IECC voters were not present to observe live debate, and likely did not watch five days of video testimony. It appears many OGCV voters might have followed a voter guide without reading the proposals.

Has ICC allowed abuse of the OGCV by allowing one special interest group to recruit "qualified voters" who are not regulatory users of the IECC, have not read the proposals or viewed testimony, and are willing to follow a voter guide with instructions: "We expect it should only take you about an hour to get through them all!"? The pendulum has swung too far.

DAVID S. COLLINS, FAIA
Architect, The Preview Group, Inc.

The online voting portion of ICC's cdpACCESS process is meant to allow every jurisdiction that adopts, uses and/or enforces the model codes to participate in the development of the I-Codes. Allocation of votes to each jurisdiction, based on population, serves is a valid means of measuring the direction the jurisdictions wish to see the code changed.

Online voting was viewed as important and necessary because of the dwindling number of voters able to attend the code change hearings. At times during last year's IECC final hearings, only 29 members voted on important changes to the code. Such small numbers voting at the hearings is not seen as truly representative.

Unfortunately, most jurisdictions can't afford to send all of their voting members to the hearings to cast votes in person. Online voting was created as a means to afford the highest number of members the ability to directly indicate their jurisdictions' wishes regarding the changes proposed to the I-Codes.

Although the online voting had start-up issues, after a full six years covering two cycles of code development, the system appears to work effectively and serves the purpose for which it was intended. Personally, I find it to be a superior effort.

BILL FAY
Executive Director, Energy Efficient Codes Coalition

By creating cdpACCESS, ICC is maximizing the online voice of the Governmental Members that give legitimacy to ICC's I-Codes. It's been said that the universe of eligible ICC voters is 100,000—I suspect it's more. Prior to cdpACCESS, the last three updates to America's model energy code were determined by about 125, 450 and 120 votes, respectively.

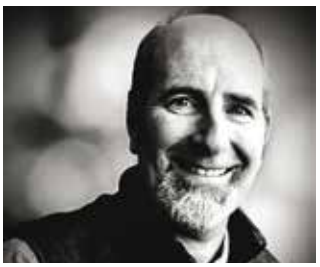
A jurisdiction's building energy consumption affects the success of as many as six departments or agencies. For a city of 75,000, that adds up to 48 eligible voters—but even though building efficiency is one of the most cost-effective steps to sound energy policy, there's no way a city can afford the time or expense to send that many employees out of town for over a week of hearings.

Add the ICC's structural hurdles against efficiency to the mix—the four anti-efficiency votes on the Residential Energy Committee and the super majority needed to overturn bad recommendations resulting from those four votes—and it becomes easy to understand why maximizing a jurisdiction's voting clout and casting their maximum eligible votes became a high priority—not just for local and state jurisdictions, but for the national, regional and state governmental associations that represent them.

ANTHONY FLOYD, FAIA, CSP
Green Building Program Manager/
Energy Code Specialist,
City of Scottsdale, AZ

I really haven't taken a strong position on the cdpACCESS and electronic voting process. I've heard all of the issues, but have generally found the process straight forward. It has been easy and convenient to submit proposed code changes, invite collaborators and manage the submittal process. However, I'm still adjusting to the online governmental consensus vote (OGCV).

During the last code cycle, I had a code proposal with sound testimony and support that received more than two-thirds majority votes at the public comment hearings, but failed as a result of the OGCV. I couldn't understand where the opposition came from. The downside of the OGCV is that you don't hear the rational for the swing of votes. At least in the public comment hearings, one can hear the pros and cons that lead up to the deciding vote. The upside of the OGCV is that you get more participation in the voting process, but with the possibility of less informed voters.



ROBBY SCHWARZ
Principal Thinker, BUILDTank

I began taking part in code development during the 2015 cycle. At times, 20-50 people were deciding on code change proposals. The online vote increased participation, but does it increase participation by the right people, at the right stage, and to what consequence?

For me, the right people are those who work in the code everyday interpreting, reviewing, enforcing, designing, building, and complying with the code. Therefore, the definition of a governmental voting member needs to be more clearly defined, and a definition for a non-governmental voting member needs to be created.

The impactful online voting occurs at the end of the public comment hearing, which can overturn proposals that failed or passed at both the committee action and the public comment hearings. Voting at the end of the process without active engagement throughout the development process significantly undermines the hearings. In essence, what is the point of the hearings?

The unforeseen consequence of the current structure is that it has become political, with lobbyists creating voter guides for voting members that are disengaged. Voting members largely vote in lockstep to their favorite political lobbyist rather than considering both the proposal and the work/time that went into creating and shepherding proposals through the process.

LAUREN URBANEK
Senior Energy Policy Advocate
Natural Resources Defense Council

We saw more voters than ever before participate in the development of the 2021 IECC—and they overwhelmingly voted in favor of increased energy efficiency. This expanded participation was made possible by online voting. With tight municipal budgets, most local governments can't afford to send all of their eligible voting members out of office for upwards of two weeks to participate in the in-person public comment hearings and voting. But those voices are still critically important! Local governments recognize how crucial a robust energy code is to meet their climate goals, and they want a say. The online voting process ensures equitable access and input. And the results speak for themselves: When more voices are heard, more good things can happen.

S. CRAIG DRUMHELLER
AVP, Construction Codes & Standards
National Association of Home Builders

The electronic voting process implemented with ICC's cdpACCESS is generally helpful in developing practical building codes. NAHB has been supportive of the online voting process since its inception. However, the support was based on the assumption that code officials made up the majority of the voters. We support code officials participating as neutral arbiters in the process, as they don't have a dog in the fight—they know what is reasonable, and they know what is enforceable. But when the ballot box is stuffed with voters who are not familiar with the building code, individual proposals or its consequences, it can greatly undermine the process and usability of the code.

The major problem is that there is no assurance that the participants in the online Governmental Consensus Vote are informed, or provide a balanced representation of governmental members. **GB**

Reference items:

- *Validation Committee*
- *Next Steps in the Code Development Process*
- *Final Action*

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

Smart Green Building in the Age of a Pandemic

Human health has become the world's No. 1 issue.

BY TERRY BEAUBOIS

FIRST OF ALL, I hope that everyone reading this is healthy and that your family members are healthy, as well. I do know people who are directly affected by health issues currently. I reside in Santa Clara County, Calif., one of the hardest-hit areas in the U.S. and I've been sheltering in place since February.

Up until now, the building industry in the multi-county San Francisco Bay Area has been limited to "essential" projects, such as airports and highway construction. It has just been announced, that many construction projects will be allowed to proceed now, including residential projects.

We all are waiting to see how the recovery and return to business as usual proceeds in the different parts of the world. In the U.S., this will differ by state and local jurisdictions for your area. We all know that countries and people worldwide are well aware of the seriousness of this significant global crisis and that it is impacting all industries, including residential and commercial building.

ONLINE MEETINGS AND CLASSES BECOME THE NEW NORMAL

During this period of time, where everyone has been forced to use online communications—some for the first time—I've been in online meetings of educators at universities and major corporations, and in contact with members of the building industry. Everyone is looking forward to returning to normal, and many people are looking forward to continuing the benefits that the increased use of online has provided. Many people are envisioning a reduced need for commuting in the future or even continuing to work from home in full-time in jobs that would allow for this.

Education systems and training systems are already increasing their online activities to continue their educational activity during periods where campuses are closed and students have been sent home. This includes college programs for building industry professionals, such as architects, engineers and construction professionals, as well as the educational training programs for jobs in building industry trades.

In addition to education, this is true throughout the building industry as well. Many building projects in design phases continue as professionals use online technology to communicate and collaborate remotely—so much so that the term "Zoom fatigue" has entered common use. Increased use of online communications between professionals and clients will continue during this time and after the coronavirus concerns are over.

Ready to work. With the arrival of the New Normal, green builders will need to be smarter and more creative to get their jobs done.

CREDIT: XAVIERARNAU/ISTOCK

SMART CITIES, TOWNS AND VILLAGES, AND HOMES

A university-level class that I have taught in-person annually at Stanford University has just been selected to be one of the courses offered online later this this year. My lecture in that course is about Homes, Towns & Villages and University Campuses, and explores how "smart city" concepts, including green building, can be applied to the many non-urban areas throughout the world. We have taught variations of this class online for two years at other universities, so we are more prepared than many to "online our class." For many in education at all levels, the new requirement of teaching online is a major shift for teachers and the students, all now in their homes teaching and learning remotely. One result will be more educational and professional continuing education classes, and training more widely available online in the future.

THE ENVIRONMENT RESPONDS

Some side effects of this pause in normal activities have included things such as the water in the canals in Venice, Italy, which are now running much clearer than ever. There are people in India who can now see the Himalayas clearly for the first time in 30 years, due to

Clearing the air. Factories and cars taken out of service due to COVID-19 has given India its clearest view of the Himalayas in decades.
CREDIT: SHUTTERSTOCK

the reduction of air pollution. These things certainly emphasize the relationship between the past, regular level of human activity and our current situation, and it raises awareness of how it does have a direct effect on our environment.

RISING AWARENESS

This pandemic is raising everyone's awareness of the reality of how an invisible health issue can bring everything to a halt. That is likely to translate into an increase in the overall importance of health-related issues in green building as we go forward. This will be reflected in everything from product selection to reduce Volatile Organic Compounds (VoCs), to increased awareness and importance of well-designed HVAC systems. Designers and building user will have a higher level of consideration of the ventilation of buildings and whether "outside air" around their building is really the "fresh air" that was assumed in the design of homes and buildings in the past. This will result in consideration of higher levels of design and filtering in new HVAC systems, as well as supplemental devices in buildings to detect and remove certain specific types of particles, and a finer degree of particles of air pollution that do affect human health.

No one knows for certain exactly what the future holds or how long a recovery may take. It may be very different in various geographical locations. Because the economy was shut down on purpose to fight the spread of a virus, the coming recovery may be quite different from past recoveries that were due to mostly economic reasons.

THE NEED FOR GREEN BUILDING

During this current time period, there is a growing, pent up demand for construction, including residential construction. People have postponed remodeling, additions and new home projects, and have delayed and will continue to delay construction of all building types.

After the current restrictions due to the coronavirus begin to be lifted, there will be:

1. Increased interest in health-related design and construction, including health security and health monitoring. This will include selection of products and building materials, and all methods of construction.
2. More designs of houses and buildings with spaces that accommodate online-at-home for social, educational and work reasons. This will include home offices and ADUs (accessory dwelling units)
3. Raised interest and awareness, on the part of clients, in the Circular Economy relative to the use of recycled products in design, construction and living, in new houses and buildings. This will include the plan for recycling of building materials at building remodeling, adaptive reuse, and demolition.

One thing is certain: smart green building will become more important than ever as we move ahead. **GB**

Terry Beaubois is an architect with 40 years of experience in residential, commercial, industrial and public buildings. He is the CEO of BKS: Building Knowledge Systems, LLC. (www.bksco.com/tbagbm) He may be contacted at tbeaubois@gmail.com

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Eco-Leaders

Green Builder's special edition featuring sustainably minded companies that have embraced the concept of net zero. Emerging from the pandemic, the new normal will be one of innovative, energy saving, zero impact products and homes.

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By Ron Jones

Follow the Light

BY RON JONES

LATELY I HAVE BEEN HEARING a lot of speculation around how things will shape up when we turn the corner on the current crisis and move on to the next version of whatever life and business are going to look like. The most optimistic among us suggest that we'll grasp the lessons we've learned and take a step up to a more responsible, more balanced approach in our work and in our daily activities; that we'll find something worthwhile to hold onto and carry forward.

Others are less hopeful, perhaps even cynical, because experience has repeatedly shown us that once an immediate threat or challenge has been put to rest the most common human response is to just want things to return to the way they were before, as quickly and painlessly as possible. We've watched it happen following natural and manmade disasters, armed conflicts, economic implosions, and, yes, pandemics.

It was the summer of 1984 (you can do the arithmetic if you feel the urge) and we were framing houses for a production builder out of California. We were definitely the smallest, slowest crew in the subdivision and could never really hope to make a good living at production framing. But we were highly meticulous and reliable, so the company used us to build their new models that summer so they could iron out the kinks before offering them to buyers.

Late on a Friday afternoon another framing contractor pulled up in front of our site just as we were closing down for the day and offered to give me several buckets of free joist hangers and other familiar hardware that he had no further use for. He explained that he was moving on from the current situation because, once again, he was having to make a choice this week between paying his crew, the insurance premium or the tax man.

I accepted his offer, and we took the opportunity to discuss the state of the industry and the ups and downs that we all had to ride through as we looked for ways to be successful and have some stability in such a crazy and frustrating line of work. Somebody suggested that we just needed 1 million dollars and we wouldn't have to worry about it anymore. Note that this was at a time when a million was still a big number.

We took turns speculating what each of us would do with the money and when it was the other framer's turn to respond he said, "I'd just keep framing houses until it was all gone and then find another place to start over again." We all shared a laugh but later the deeper message of his words began to sink in.

He wasn't simply expressing his passion for the work that he loved doing. In a larger sense he was sharing that no matter how many "last" Fridays he had to go through, he wasn't interested in changing how he went about conducting his business. As long as he could find work doing what he enjoyed the most, he was willing to endure the pain, no matter how many times the outcome repeated itself.

The lesson here is that, like the departing framer, we are all going to be faced with choices once we emerge from this particularly dark and uncertain time. In spite of these dire circumstances, we have been given an opportunity to step back, take a deep breath and a hard look at ourselves, and decide if we only want to get back to the way things were *before*, or maybe, just maybe, aspire to something better. GB

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