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STRONG AND STEADY

DESPITE TREMORS IN THE HOUSING MARKET AND ANXIETY ABOUT THE CLIMATE CRISIS, construction continues apace.

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The Algorithm of **Housing Anxiety**

THE USE OF COMPUTER SOFTWARE TO SET RENTAL RATES IS A PATH TO SOCIETAL SUFFERING.

Often we focus on the end results of a fundamentally flawed decision. For example, the media tends to focus on anti-democratic political efforts, and backdoor deals that benefit only the rich and corrupt politicians—not the fact that corporate money (thanks to past Supreme Court decisions) can flow virtually unrestricted into political pockets. The rot, as they say, is at the root. It began with a bad idea.

Along similar lines, we're being told that the nation has a vast and deep housing shortage. Young families can't find homes within their budget, and an increasing number are becoming semi-permanent renters. For example, apartment listing service [RentCafe](#) reports that the percentage of rentals to ownership is at the highest level in 55 years. In the biggest 50 metro areas, 101 ZIP codes flipped from homeownership households to rentals over the past 10 years.

Markets ebb and flow, of course, but something else is happening this time. Rents are rising, even in places where intuition might suggest they can't be sustained. But intuition, and human beings for that matter, may have little to do with it.

According to investigative news site [ProPublica](#), in some cities, as many as 70 percent of rentals run by large companies such as apartment manager [Greystar](#) are being priced with a piece of software called [YieldStar](#), produced by property management firm [RealPage](#). What's chilling, if not surprising, about this landlord-by-proxy technology is that it's actually promoted as a way to take messy, emotional human beings out of the landlord-renter relationship.

Why does this matter? Because traditionally, renters in many parts of the U.S. have been able to negotiate for better terms. This, in turn, allows them to save money for a down payment on a home, put a kid through college, and surpass other basic middle class stepping stones.

One RealPage exec bragged to ProPublica, that as a property manager, "very few of us would be willing to actually raise rents double digits within a single month by doing it manually."

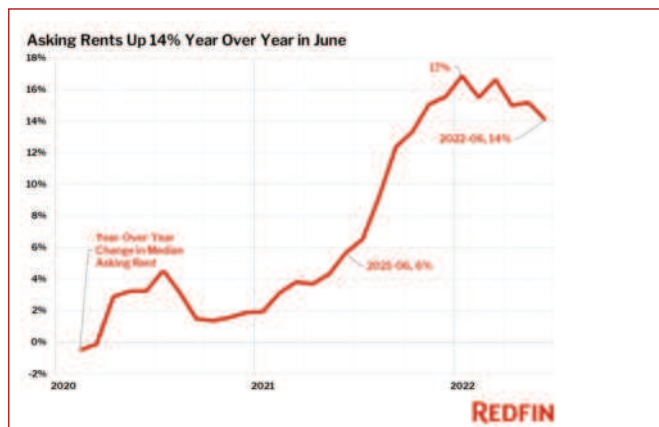
Note that this caution isn't out of fear of upsetting tenants. It's fear of overreaching the market and ending up with empty units. There's only a certain risk landlords are willing to take.

Not to worry, says the YieldStar computer. The algorithm shows that if you toss out the current tenants and raise rent by 20 percent, you'll haul in a big return even if the apartment sits empty for three months.

ProPublica reports that one developer for data analysis firm RealPage told them that "leasing agents had 'too much empathy' compared to computer generated pricing."

Some of you are probably thinking, what's the problem? Maximizing profits on rentals is the end game, right? Am I a luddite, because the idea of putting human interactions in the hands of a computer makes me uneasy?

There's a reason, for example, that our air force does not hand over command and control to computer algorithms. What if the algorithm shows that a nuclear first strike has a 60 percent chance of killing 1 billion fewer people than waiting to give a retaliatory response?



Rising rents. Nationwide, rents rose dramatically over the past two years. Computerized decision making bears part of the responsibility. SOURCE: Redfin

For the shrinking middle class, trapped between high home prices and volatile, computer-controlled rents, a genuine desperation is setting in. Forget those retirement aspirations. Back into the workforce you go, this time at the bottom of the ladder to cover your additional living costs.

Among my renter friends, the cycle goes something like this: shock as you get your new rent notice; panic as you plead with the property owner for some empathy (to no avail); frustration as you seek a new, more-affordable place (there's nothing); and resignation, as you realize you're stuck, and getting stuck.

Naturally, YieldStar's management defends the use of their software, downplays its negative impacts on the rental market, and harps on its continued growth in influence and reach. They note that when it's first introduced to property managers, the staff tend to resist 10- to 20-percent of the suggestions. Multifamily owners typically like to keep occupancy at 98 percent or so. With computers at the helm, 95 percent is the new comfort level.

Apartment construction is red hot, but few of those units will fall in the affordable category. The system is failing all but the top of the economic ladder. My prediction: You're going to see a surge of restrictive rental legislation in the next few years at the metro level, not unlike what's happening where I live, in Portland, Maine. There are rent caps, strict limits on rent increases, and tenant protections that make eviction slow and costly. These are not all good policies, but as housing costs hit existential levels, algorithm proponents may run into something that does not compute: rebellion and rage against the machines.

Ultimately, the attempt to gouge every last housing dollar from the middle class by testing every limit (as computers like to do) may result in a backlash that could set the rental market on its heels for years to come. **GB**



Matt Power
Editor-in-Chief

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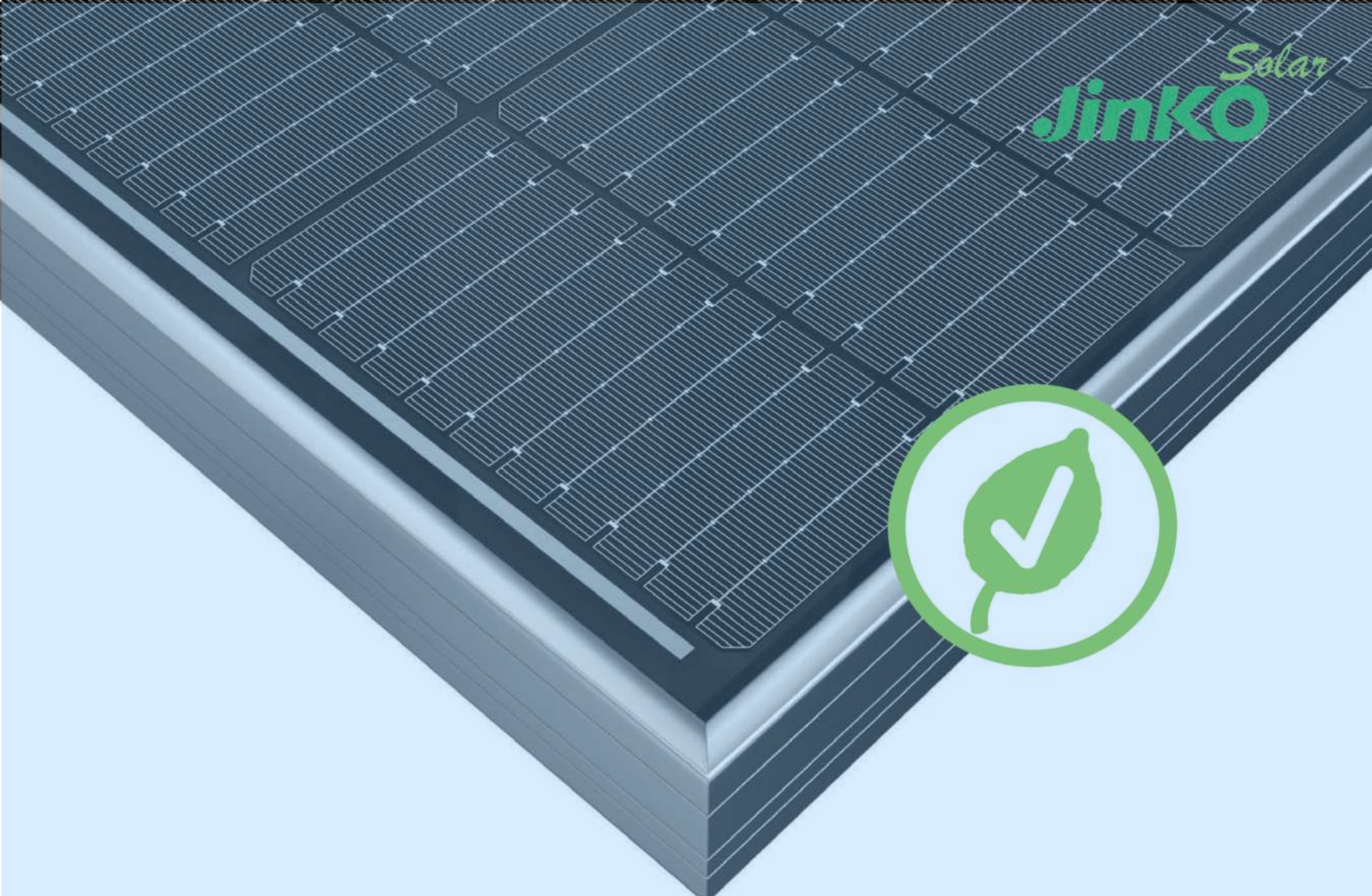
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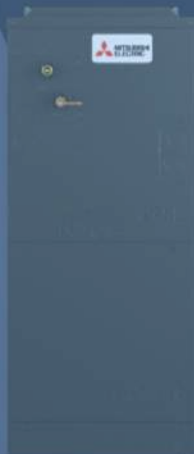
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THE STATE OF SUSTAINABLE BUILDING 2023: STRONG AND STEADY

Despite tremors in the housing market, construction soldiers forward. But will the good times continue, or are we headed for a meltdown?

A NEW CLIMATE REALITY: Our planetary future is uncertain. But we might still change course in time.

POWERING UP: With all-electric homes, it's a case of common sense: electrify, and they will buy.

THE ESG ERA: Corporate adherence to sustainability is making green real estate an investor's world.

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"We're not in land development, we're in water development. Water is so expensive, and we need to conserve it and use it properly." **PAGE 36**

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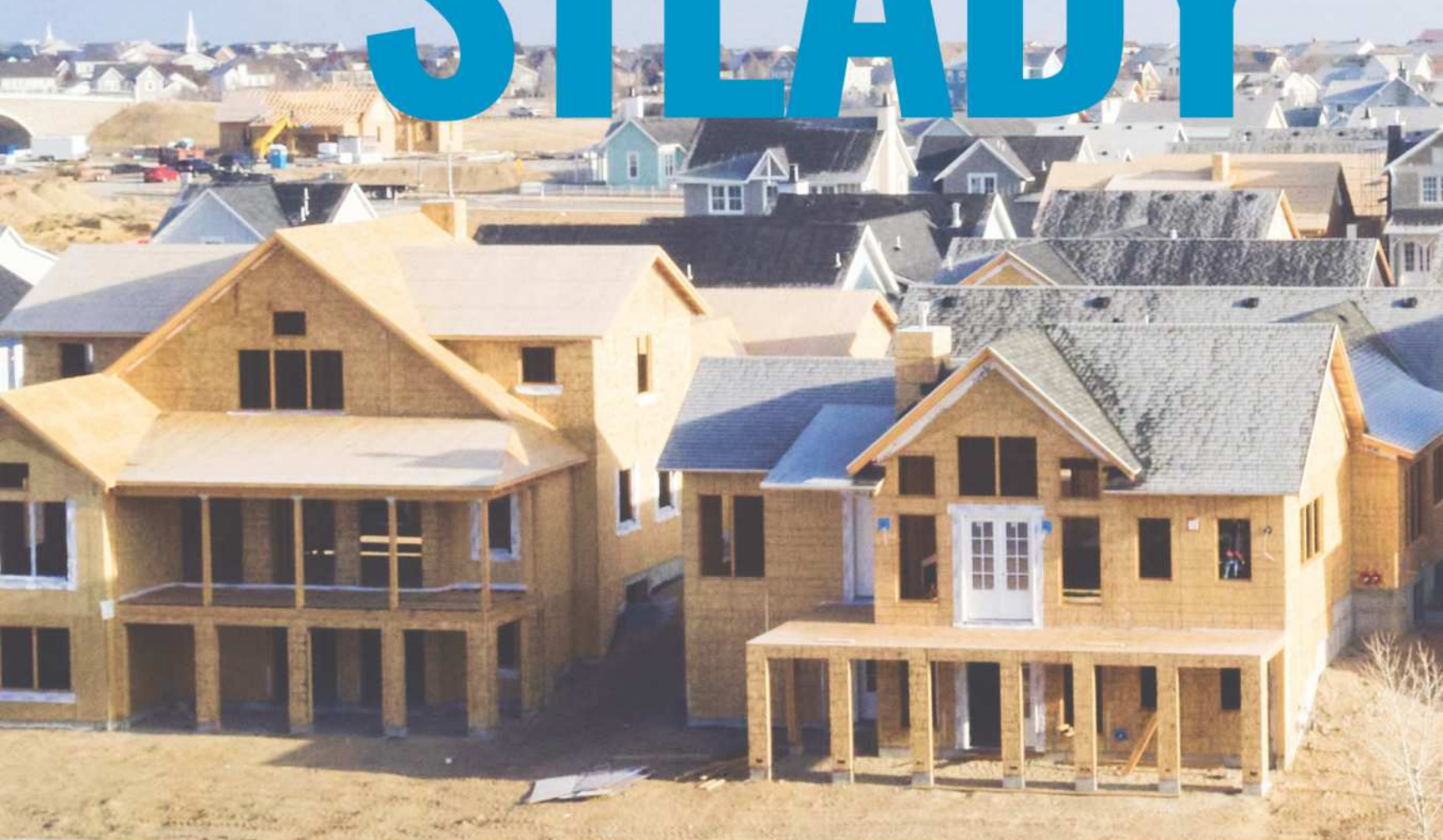
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THE STATE OF SUSTAINABLE BUILDING 2023

Despite tremors in the housing market, construction soldiers forward. But there are questions: Will the good times continue, or are we headed for a meltdown? Are builders going to stay in overdrive, or will buyers get a chance to catch their breath? How long will it take to recover from the pandemic? And what role will President Biden's Inflation Reduction Act play?

Green Builder's annual report offers data-driven insights about who's buying, what's still important to the building industry, and where innovation may lead. Here's what we found.

What lies ahead? Reports of Earth's climate-driven demise may be premature—or at least, not as severe or as fast as expected.

► Part 1:

A New Climate Reality

Our planetary future is uncertain.
But we might still change course in time.



BY ALAN NADITZ

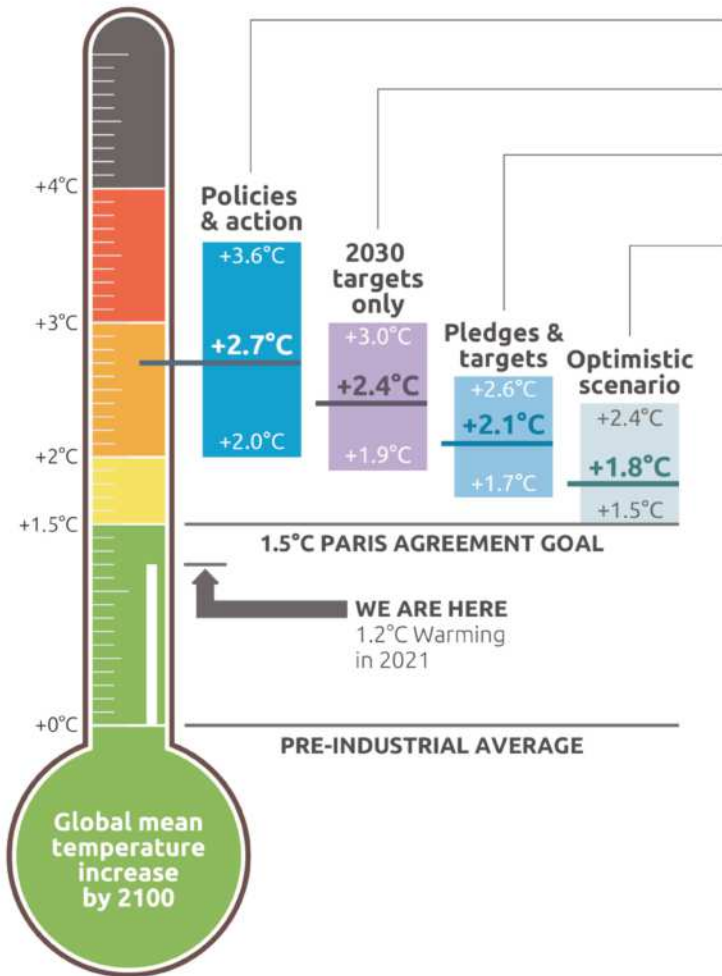
In 2019, when David Wallace-Wells released his novel, “The Uninhabitable Earth: Life After Warming,” there was one word to describe the world’s future: Apocalyptic. By century’s end, scientists could see Earth’s temperatures rising by 4 to 5 degrees Celsius. That’s bad enough to create a food crisis, economic strife, and in the most extreme case, “warnings of civilizational collapse.”

But only three years later, Wallace-Wells has slightly moderated his prediction. Although the world’s temperature has already risen 1.2 degrees since pre-industrial times, some scientists now believe that warming this century will most likely not exceed 3 degrees. That’s not a big shift, but it’s something. [A U.N. report in 2019](#), suggested we would hit 3.2 degrees of warming by that date. But a United Nations World Meteorological Organization (WMO) report just released puts the estimate closer to 2.5 degrees Celsius by 2100. This is still more than the 1.5 degrees established by the 2015 Paris Agreement as the maximum increase that the planet can handle before catastrophic climate change occurs. “The greater the warming,” notes WMO Secretary-General Prof Petteri Taalas, “the worse the impacts.”

Wallace-Wells argues, however, that real progress is underway. “Those numbers may sound abstract,” he notes. “But what they suggest is this: Thanks to astonishing declines in the price of renewables, a truly global political mobilization, a clearer picture of the energy future and serious policy focus from world leaders, we have cut expected warming almost in half in just five years.”



Global Temperature Increase by 2100



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* If 2030 NDC targets are weaker than projected emissions levels under policies & action, we use levels from policy & action

Mixed thoughts. In terms of climate change, scientists have four different scenarios, ranging from current actions, to promised and optimistic settings. SOURCE: Climate Action Tracker

tion fell by a record 4.3 percent in 2020. The pandemic and Russia's war with Ukraine have since pushed demand up by almost 7 percent over the past two years, but that is expected to be a temporary spike, according to a report by the International Energy Agency (IEA).

While coal declined, natural gas moved into the forefront. Since 2015, the "bridge fuel"—so named because it's a cleaner burning fossil fuel that can ease the world's transition to carbon neutrality—has risen from 19 percent to 38 percent of the U.S. energy market. "It's hoped that innovations in the energy sector, such as the conversion of gas-driven power plants to even cleaner burning hydrogen, will help the transition away from natural gas in the long-term," the EIA notes.

Opponents of natural gas hope that "long term" is actually another way of saying "very soon." A report from Enoxa Energy notes that drilling and extraction, and transporting of natural gas in pipelines, can leak methane, which is 35 times stronger than carbon dioxide at trapping heat. Land disturbance for gas and oil drilling also harms ecosystems through erosion and pollutants that leak into nearby streams, the report adds.

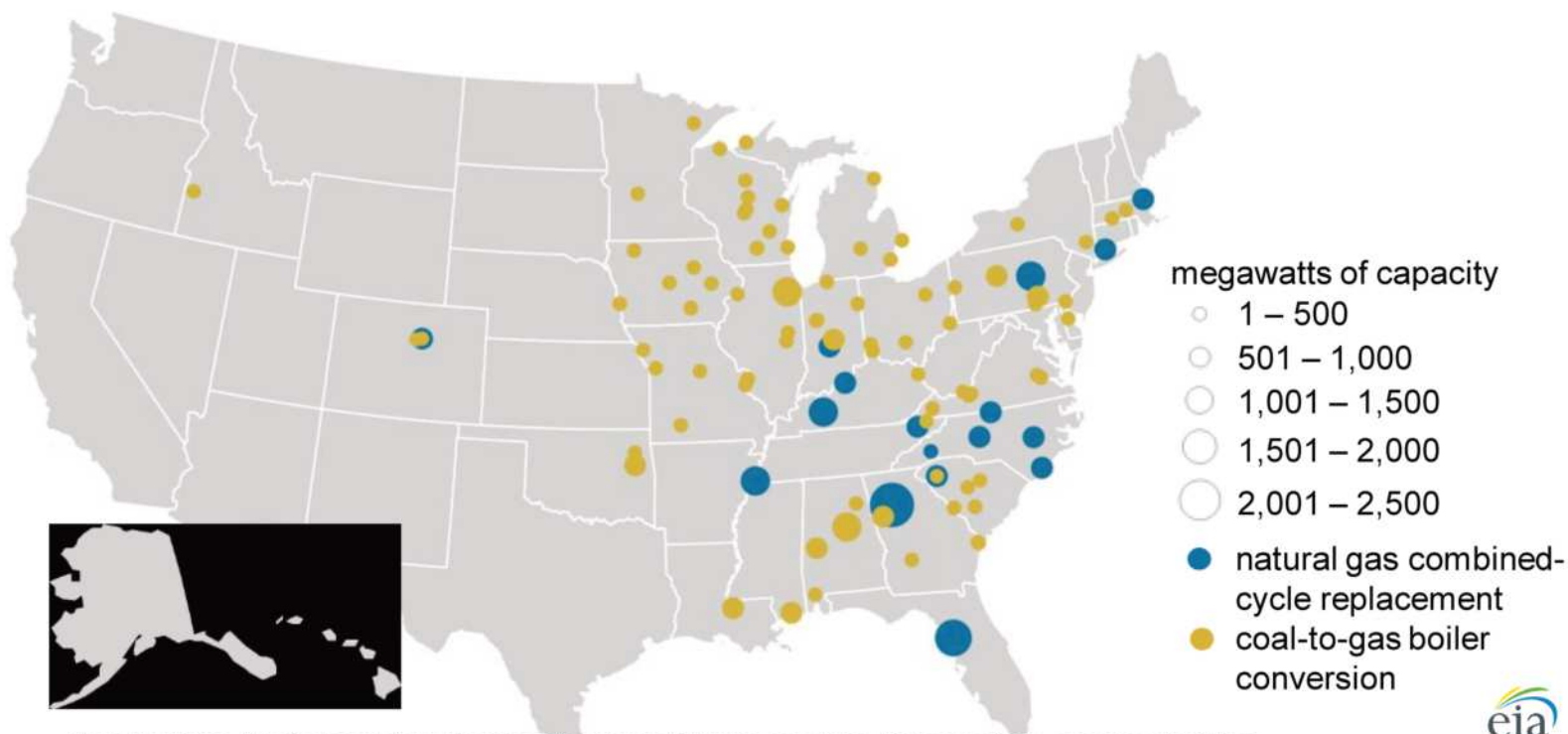
And then lower-priced solar and wind power came along, topped off by improved lithium battery technology. Wallace-Wells notes that since 2010, the cost of solar power and lithium-battery technology has fallen by more than 85 percent, and the cost of wind power by more than 55 percent. In addition, the IEA has **predicted that solar power** would eventually become "the cheapest source of electricity in history," and a

LONG-TERM COAL PHASE OUT?

For two decades, the bad boy of the environment has been coal. According to the World Health Organization (WHO), coal produces 44 percent of U.S. electricity, but accounts for 80 percent of power plant carbon emissions. "Burning coal leads to soot, smog, acid rain, global warming, and carbon emissions," WHO notes. "It also generates a great deal of waste, including sludge, toxic chemicals, and heat...and pollutes during every stage of the energy production process, from mining and transportation to storage and burning."

Such findings have helped drop worldwide demand for coal down to historic lows. From 2005 to 2020, use of the product in the U.S. for electricity generation dropped from 50 percent to 23 percent; the U.S. Energy Information Administration (EIA) adds that global coal consump-

U.S. coal-to-natural gas plant conversions by conversion type and capacity



Changing times. America's coal plants have been transformed into cleaner burning—but not perfect—natural gas facilities. SOURCE: U.S. Energy Information

Administration

report by Carbon Tracker found that 90 percent of the global population lives in places where new renewable power would be cheaper than new dirty power. “Consider that the price of gas was under \$3 per gallon in 2010,” Wallace-Wells notes. “This means that these price decreases are the equivalent of seeing gas-station signs today advertising prices of under 50 cents a gallon.”

APPLIANCES AS A BELLWETHER OF CHANGE

If there's any housing-related market that will enjoy a post-pandemic boom period, it's the one for energy efficient appliances. Euromonitor International reports that after a lackluster 2020—during which the market grew by a mere 0.3 percent—it rebounded a year later with a more-robust 3 percent rate. Things were flat in 2022 and should cool in 2023 due to a higher interest rate environment and the fact that much of the major appliance demand was fulfilled during the past two years.

“Consumers had an interesting two years with on-and-off lockdowns to consider the appliances they wanted to have at home,” the report notes. “In the early part of 2020, the focus was on food storage and hygiene-related appliances. Starting from mid-year, as consumers experimented with cooking at home, the focus shifted towards cooking appliances, small and major.”

In 2021, consumers continued their cooking at home experience, with many exploring new recipes from their social media feed, the report notes. High-growth sectors shifted from major appliances to small appliances, predominantly in the food preparation and hygiene areas.

Heading into 2023 and beyond, Euromonitor International expects the following trends to have a major impact on the industry:

- There will be a renewed focus on sustainability. With the focus on hygiene gradually fading after two years of the pandemic, companies are refocusing on long-term environmental sustainability in

their products and operations. The near-term goal includes being carbon neutral in their own operations, while the long-term goal is to reduce their products' impact on the environment. For consumers, Environmental, Social and Governance (ESG) has become a key buying criterion.

- Moving forward, consumers can be expected to have a more seamless experience when creating their smart homes. Consumers may not face the pitfalls of incompatibility between devices from different brands.
- There is growing disagreement in the U.S. over the use of natural gas in new homes and commercial buildings. This has led to states enacting laws for and against natural gas piping to homes and commercial buildings. Ultimately, in the longer term, consumers are trending towards induction and vitroceramic built-in hobs.

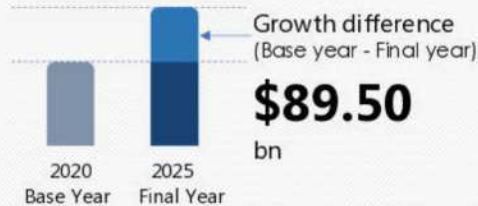
“The appliance market is fragmented...competitors have to focus on differentiating their product offerings with unique value propositions to strengthen their foothold in the market.”

— Technavio, “Household Appliance Market by Product, Distribution Channel, and Geography - Forecast and Analysis 2021-2025.”



GLOBAL HOUSEHOLD APPLIANCE MARKET 2021-2025

CAGR over (2020-2025)



The market is **FRAGMENTED** with several players occupying the market share



One of the **key drivers** of the market will be the **product innovation leading to portfolio extension and product premiumization**



53%

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Market Segmentation By Product

- Major household appliances
- Small household appliances

Market research firm Technavio backs up Euromonitor's findings—to a point. It notes that the major household appliances product segment—which held the largest appliance market share in 2020—grew largely because of the growing disposable income and changing lifestyle of the population—such as a move toward all-electric homes—coupled with rising urbanization. For the next few years, a growing number of dual-income households across the emerging and developing economies are anticipated to drive the sales of climate-friendly household appliances, including refrigerators, air conditioners and washers.

But in its [housing market appliance forecast for 2021-2025](#), Technavio also takes a somber view. "The market is fragmented, and the degree of fragmentation will decelerate during the forecast period," the company notes. "Competitors have to focus on differentiating their product offerings with unique value propositions to strengthen their foothold in the market."

To make the most of the opportunities and recover from post pandemic impact, market vendors should focus more on the growth prospects in the fast-growing segments, while maintaining their positions in the slow-growing segments, Technavio adds.

WILL SOLAR SAVE THE DAY?

As the cleanest form of energy, solar continues to make strides with consumers. Data from the Solar Energy Industries Association (SEIA) bears this out: In 35 years, the conversion efficiency of photovoltaic

panels has increased from 20 percent to 33 percent. Meanwhile, the per-watt cost of solar energy was about \$300 in 2006; by 2019 it dropped to \$3—largely due to new federal solar tax credits. And between 2010 and 2017, utility companies saw the cost of solar-generated electricity drop from 28 cents to 6 cents per kilowatt-hour (kWh), according to the U.S. Department of Energy (DOE). This reduction also meant a 52 cent to 16 cent per kWh decline for homeowners.

Overall market growth has been strong. IBISWorld reports that solar industry revenue hit \$10 billion in 2019—making for an annual growth rate of 36 percent annually over five years. The U.S. market is expected to hit \$22.9 billion by 2025.

Other data from SEIA reinforces the expectation that solar energy will continue to head for bigger and better things in 2023 and beyond:

- Installations will more than triple in solar capacity over the next five years, surpassing 300 gigawatts by 2027. A key factor will be the Inflation Reduction Act, which includes 10 years of investment tax credits.
- Demand for solar will continue to increase as more businesses embrace it and report energy savings. The yearly growth rate will hit 40 percent by 2027.
- Solar installations will increase across all market segments through 2023 among non-utility businesses and developers looking to take advantage of federal tax credits.

- Energy investment models pioneered by Fortune 500 companies will continue to attract big investors.
- Improvements in solar battery technology will continue among researchers. Current home solar batteries typically provide 10 kWh of capacity. These batteries, which have a lifespan of up to 15 years, can be stacked to increase capacity as scientists aim for greater efficiency.
- Declining prices for solar panels and batteries will continue, attracting new buyers who want to save on otherwise uncertain energy costs.
- Over 96 percent of net new energy generation capacity in 2023 will come from solar and wind sources, according to Deloitte.
- Solar construction costs fell by 37 percent from 2013 to 2017.
- Demand will increase for a broad range of solar products such as solar-powered generators, portable smartphone chargers, outdoor motion sensor lights, backpacks, and cookers.

ROOFING: A HOT COMMODITY

Easier and more cost effective solar energy planning will supercharge roofing projects over the next few years. Information vendor [Research and Markets](#) forecasts that the market for solar roofing products in the

U.S. will rapidly increase to 716,000 squares, valued at \$965 million in 2025. A key driver will be the expanding impact of solar-friendly policies in a growing number of states and localities nationwide, particularly in the large California market, where revisions to the state building code will mandate almost all new buildings to install solar products as of 2023.

Other growth factors, according to Research and Markets, include:

- Rising awareness of the energy-efficiency benefits of solar roofing systems.
- The attractive appearance of solar roofing compared to traditional solar arrays.
- Growing availability, affordability, and accessibility of solar roofing products.
- Expansion of local, state, and federal incentives to install solar roofing products.

Meanwhile, the regular global roofing market is expected to rise from \$79.3 billion in 2020 to \$101.9 billion by 2027, for a 3.7 percent annual growth rate. The data, from [ReportLinker's 2022 Global Roofing Industry](#) market report, also projects asphalt shingles as reaching a 3.4 percent growth rate and \$31.5 billion in sales by 2027. The metal roofing segment, meanwhile, will grow by 4.5 percent annually over the next seven years. **GB**



Surf or Sink?

THE STATE OF
**SUSTAINABLE
BUILDING 2023**



Positive negativity. There may be a housing slowdown ahead, but that could temporarily turn out to be a good thing for harried builders, and "get it now"-pressured homebuyers.

If we head into another recession, will the housing sector be able to ride the wave?

BY SARA GUTTERMAN

Soaring inflation, high prices at the pump, and rising interest rates have many in the construction industry pondering a huge question: What's ahead for the housing market?

Many of the country's leading builders, large and small, are experiencing the same thing: a decided slow-down in sales since the Federal Reserve increased interest rates. One builder even reported that sales had decreased from 125 homes per month earlier in the year to 3 by mid year.

While they lamented the downturn, most of those builders are quick to point out that their current pipeline of sales would carry them through at least the end of 2022. In some ways, they are happy to have a little break in the action to catch their breath from the craziness of the last two years and allow the supply chain to catch up.

Manufacturers generally feel the same way—some had expected a dip in sales, but they also forecasted that the drop off would be more of a blip than a plunge.

"I think we're in a scenario that is more like 2002, when the tech industry was impacted but the housing market stayed relatively stable," says Dave Bernadino, partner at Ammunition, an Atlanta-based marketing agency. "In 2008, the housing market crashed due to unsound fundamentals."

Ron Jones, president of Green Builder Media, also has a bullish view of the housing sector. "No doubt, soaring inflation, high gas prices, and supply chain challenges are putting pressure on homebuyers and impacting the housing sector, and we can expect that rising prices will cause the housing market to cool off a bit," Jones asserts. "But, given the imbalance of demand and supply, and the desperation of homebuyers of all kinds, the shelter industry will not only survive the downturn, but it will be a leader in the recovery of our economy."

Experts expect the continued tapering of home sales and cooling off of

prices in the coming months. But, they also feel that market "right sizing" is a good thing—for builders and developers fatigued by the breakneck speed of the 2020-21 housing market, and for homebuyers, who won't feel as pressured to pay more than the asking price for homes that don't totally fit their needs in the frenzied get-it-before-it's-gone environment of the past two years.

DESIGN REDESIGNED

While the depth and breadth of the economic impact to the housing sector is up for debate, the way future homes are designed and built will be different from the past. This is due to a unique combination of pressures, such as persistent labor challenges and material shortages that have wreaked havoc on construction schedules; intensifying wildfires, superstorms, extreme temperature, floods, and other natural events that have necessitated a more resilient built environment; and changing consumer expectations that are dictating healthier, higher-performance homes.

Experts also say that an evolution is taking place: The building sector is changing from within. Most builders have awoken to the fact that a decarbonized, net zero, electrified, healthy, connected, resilient future is inevitable, and they need to claim their seat at the table before they get put on the menu.

Many of the large production builders are adding executive positions to oversee corporate sustainability initiatives and Environmental, Social, and Governance (ESG) efforts. But the verdict is out as to whether these companies will raise the bar and create real change, or merely use pretty marketing language to "greenwash the floor."

Certainly, the SEC's climate risk disclosure requirements for public companies will require some level of authenticity and transparency, experts note. But the rest remains uncertain.

► Part 2:

Powering Up

With all-electric homes, it's a case of common sense:
ELECTRIFY, AND THEY WILL BUY.

BY GREEN BUILDER STAFF

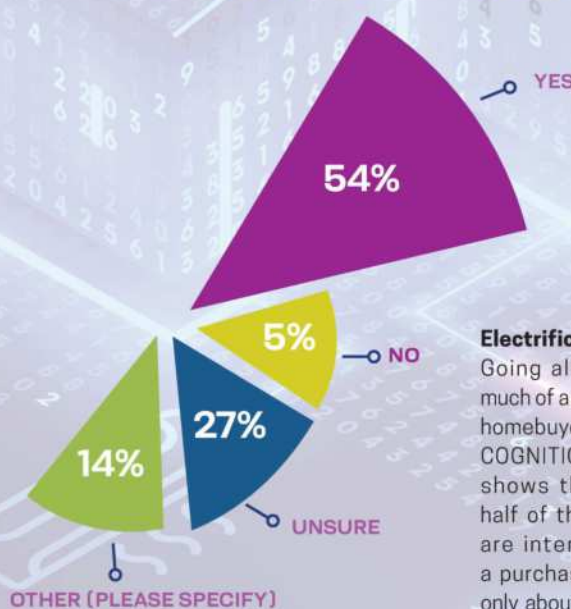
Given that buildings in the U.S. consume 70 percent of the nation's total electricity and generate 40 percent of the nation's total carbon emissions, it is more important than ever to transition to a net zero (energy, water, and carbon), all-electric, resilient-built environment.

According to the U.S. Environmental Protection Agency (EPA), approximately 70 million American homes burn natural gas, oil or propane to heat interior space and water. This generates 560 million tons of CO₂ each year.

Fortunately, the electrification of America is happening, with jurisdictions from California to New York implementing mandates and rebates for all-electric new construction and retrofits.

Approximately 26 percent of all homes in the United States were run entirely with electricity in 2020—the most recent data available—according to the U.S. Energy Information Administration (EIA). That number will continue to grow, with increased recognition of the damaging impact of natural gas-powered systems and appliances on the planet and on people's health, and also due to the increased costs of gas.

Would you buy an all-electric home?



Electrification attitude.

Going all-electric isn't much of a question for new homebuyers. A survey by COGNITION: Smart Data shows that more than half of the respondents are interested in such a purchase. In contrast, only about 1 in 20 say no.

SOURCE: GREEN BUILDER MEDIA



INCENTIVES TO ELECTRIFY

The IRA bill encourages homeowners to electrify their homes by offering up to \$14,000 to install advanced technologies and make energy efficiency improvements. Incentives include:



Up to \$8,000 in rebates and up to \$2,000 in tax credits for heat pump technology for space heating and cooling



Up to \$4,000 in rebates for smart electric panels



Up to \$2,500 in rebates for updated electrical rewiring



Up to \$1,750 in rebates for all-electric water heaters



Up to \$1,600 in rebates for insulation, air sealing and ventilation upgrades



Up to \$1,200 in tax credits for energy efficient windows and doors upgrades



Up to \$840 in rebates for electric stoves and electric heat pump clothes dryers

THE STATE OF SUSTAINABLE BUILDING 2023



APPROXIMATELY 26 PERCENT OF ALL HOMES IN THE UNITED STATES RUN ENTIRELY ON ELECTRICITY. THAT NUMBER WILL CONTINUE TO GROW, WITH INCREASED RECOGNITION OF THE DAMAGING IMPACT OF NATURAL GAS-POWERED SYSTEMS AND APPLIANCES ON THE PLANET AND ON PEOPLE'S HEALTH.

Evolving codes are encouraging the phaseout of natural gas infrastructure. Some municipalities are completely banning natural gas hookups, while others are offering incentives, like density bonuses, to builders and developers who electrify their communities.

There is also the recently signed Inflation Reduction Act of 2022 (IRA), which allocates \$369 billion to reduce domestic emissions approximately 40 percent below 2005 levels by 2030. (See the section "Climate Action Reaction" for more details.)

According to Charlotte Cohn, a research analyst for the American Council for an Energy-Efficient Economy (ACEEE), residential energy use accounts for roughly 20 percent of greenhouse gas emissions in the United States, making building electrification a key priority for fighting climate change. "If U.S. residential buildings were a country, it would be the sixth-highest emitter of greenhouse gasses in the world," she says. "The time for comprehensive solutions is now."

The Energy Marketplace Changes Gear

Car facts. Fifteen percent of consumers planned to buy electric vehicles in 2021, and they followed through: EV sales rose by 85 percent from 2020 numbers. CREDIT: Gencat/Flickr

Which of the following would you invest in to make your home all-electric?

Times are changing, and so will consumer engagement with energy.

BY BETH CROUCHET

One of my colleagues said it best: The electrical grid is the largest, most complex machine ever created by man. In the 1950s and 1960s, the rise of consumer appliances and air conditioning was possible due to the introduction of interconnected power grids and, later, nuclear power. As the number of A/C units increased, electric utilities had to build out and evolve their infrastructure to handle the load.

Fast forward to 2022, with the most significant climate bill in U.S. history—the Inflation Reduction Act (IRA)—now signed into law. For companies, it incentivizes definitive investments in clean technologies that will, once again, change the grid. Rebates, tax credits and incentives await for those customers who invest in proven and next-generation energy technologies—advances that will ultimately help provide more energy options, accelerate the transition to more electric vehicles (EVs), and shift the grid into a new era.

According to recent data from Parks Associates, the number of smart home devices—from thermostats and device-control products to security components, including doorbells and locks—has increased among smart home device owners. On average, owners have eight of these devices.

Smartening up around the house isn't the only area of increasing interest for homeowners. Data shows us that 15 percent of U.S. households reported intentions to buy an EV in 2021. According to the Energy Saver guide from the U.S. Department of Energy (DOE), EV sales grew by 85 percent from 2020 to 2021.

The fact that homeowners are increasing the number of smart devices they have, and that more heads are turning for EVs, creates a foreseeable growth in electricity demand. Utilities need to look towards leveraging these devices to control and save energy.

ENERGY AWARENESS: AN UNTAPPED OPPORTUNITY

When it comes to energy consumption, the old adage, "ignorance is bliss" does not apply. Research says that 44 percent of U.S. internet households actively work to reduce energy consumption.

However, familiarity with energy devices is low.

One-third of internet households don't know what kind of power they get from their utilities, and among those, more than half (58 percent) don't know where to find out, according to Parks Associates data. These unknowns create a challenge in building awareness of new programs that offer energy efficient features. The IRA legislation provides an opportunity for energy providers, utilities, HVAC dealers, solar installers and residential security players to provide products and services that help consumers better understand their energy consumption, what items in their home drive energy use, and how to gain further information.

A homeowner who receives a system like this benefits from unified control and better data insights across the home, unified billing, and discounts on bundled purchases. They also get energy savings—heating and cooling account for 50 percent of home energy consumption.

Providers and other said players can now provide added value by teaching homeowners how their houses use energy, and about the impact on their comfort if they were to save some of that energy.

The benefit to the channel is that they can offer more hardware to upsell, including a monitoring contract/recurring monthly revenue (RMR) opportunity. There is also more diversity in the portfolio, such as added energy storage solutions, integration with EV chargers, security systems, and additional smart home products. These channel providers also benefit from expanded distribution and potential recurring revenue from monitoring services (e.g., HVAC, security, etc.).

The level of interest in smart devices and EVs, and the intent to save energy, are most certainly set to increase as the IRA's provisions roll out over the coming months and years. However, that's not necessarily the case for general awareness around energy and how to locate further resources. This creates the perfect opportunity for professionals and service providers to educate homeowners and customers on smarter energy usage, bundles, and efficiency.

Beth Crouchet is utility solutions leader for Resideo's Grid Services sector. Resideo is global provider of home comfort and security solutions.

17%
Electric
fireplace

13%
Other

31%
Energy
management
system

33%
Clothes
washer/dryer

A matter of priorities. Many things must be considered when converting a home to all-electric status. Heat pump heating and cooling, and solar power are at the top of the list. SOURCE: GREEN BUILDER MEDIA



61%
Heat pump
heating and
cooling system

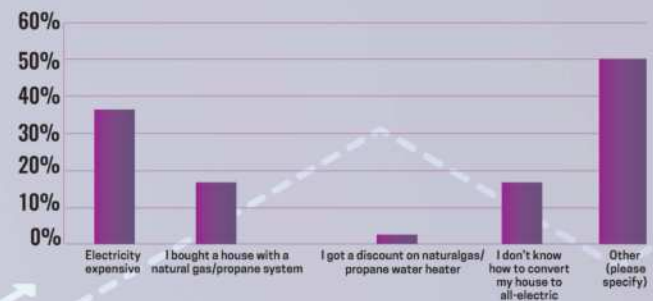
58%
Solar array
/system

47%
Heat pump
hot water heater

42%
Smart thermostat

36%
Induction
cooktop

What would prevent you from buying an all-electric home?

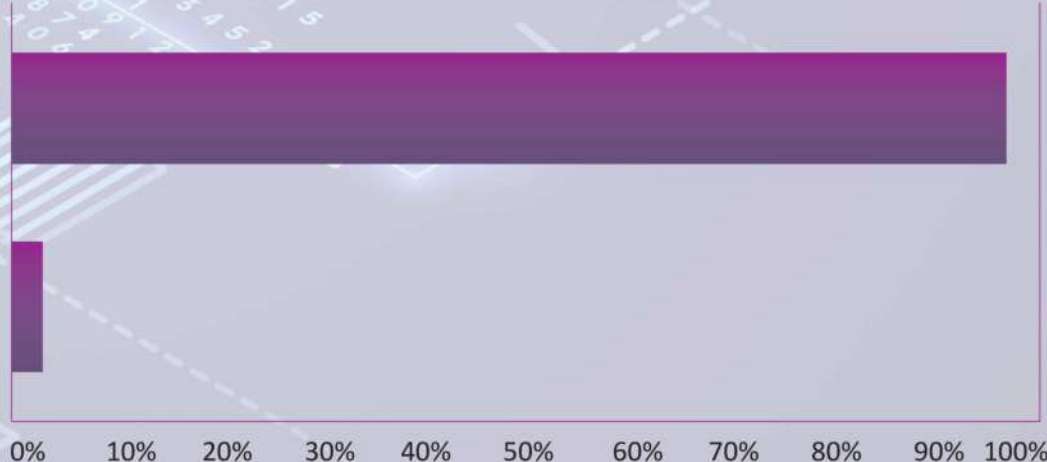


Solar opportunity? About a third of respondents think electricity is too expensive to convert to all electric. Residential solar arrays could mitigate that concern. SOURCE: GREEN BUILDER MEDIA

Do you think it's important for homes to be energy efficient?

YES

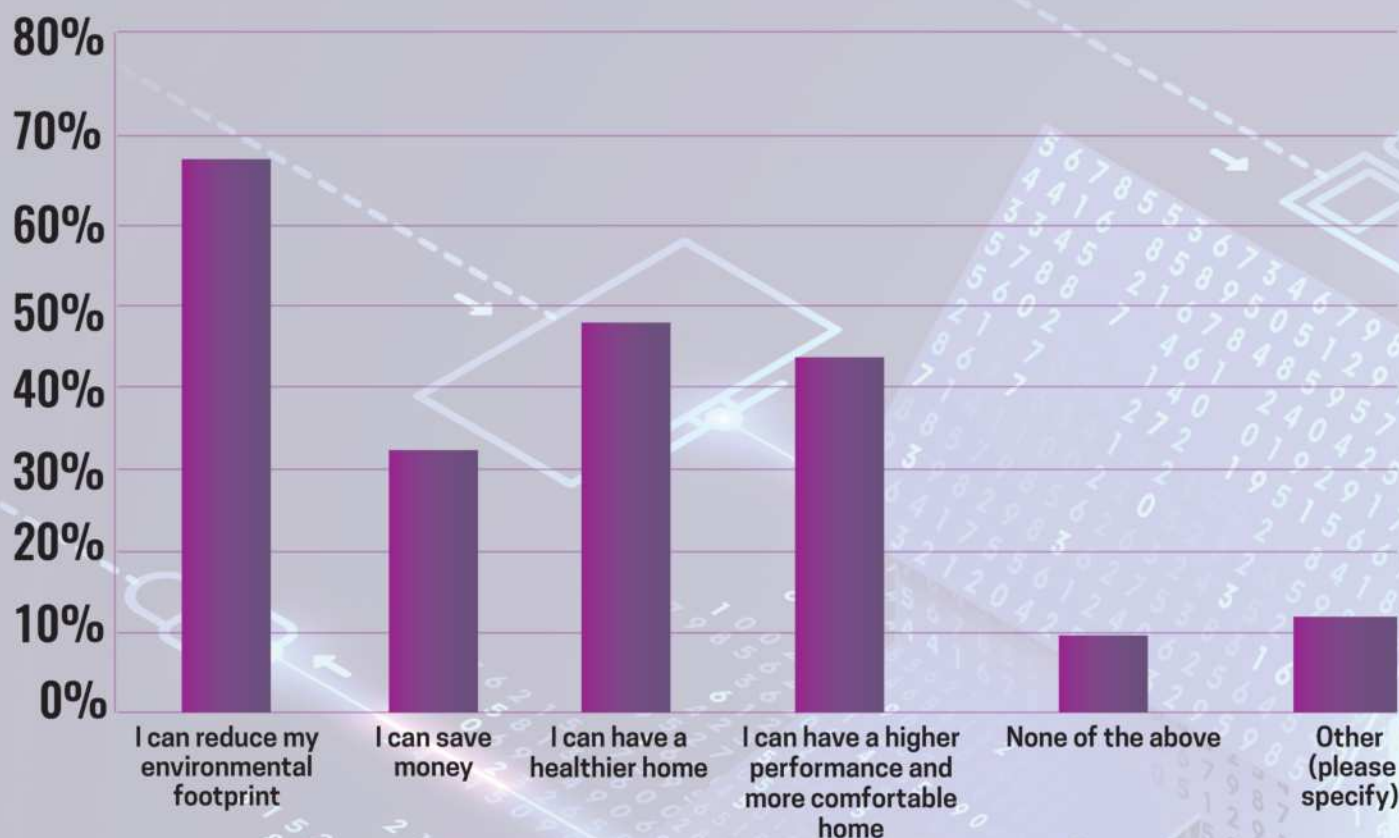
NO



No brainer? Almost universally, survey respondents indicated that they believe that it's highly important for homes to be energy efficient.

SOURCE: GREEN BUILDER MEDIA

What do you think are the biggest benefits to owning an all-electric home?



Healthy connection? Homeowners want to go all-electric to reduce their environmental footprint, but they also associate electric appliances with healthier living. It's not clear which aspect of the appliances leads to that perception, although induction cooking, for example, does tend to produce far less indoor pollution than gas cooktops, and air filter systems generally run on electricity. SOURCE: GREEN BUILDER MEDIA

OBSTACLES AHEAD

Certainly, consumer demand, evolving codes, and the impending infusion of federal funding are driving the electrification of the built environment. But there are some fundamental challenges that may slow the pace of transformation.

First, power grids are regulated by federal, state and local authorities, and operated by utility companies that may not have the capacity to quickly upgrade their systems to manage a new heavy reliance on electricity.

Major investments are needed to update grid infrastructure, transformers, conductors, service panels, and equipment to handle the increased demand that will result from the electrification of homes and buildings. Few utilities are currently prepared to incur these costs, and it's unclear whether they will allocate funding for these equipment upgrades or if they'll try to pass the cost along to home and building owners.

While \$73 billion was included in the recently signed infrastructure bill to help cover grid upgrades, it can take years for projects to be approved and funded. In the meantime, customers and utility companies will need to adapt their existing equipment and prepare for future consumption increases.

Also, scale matters when it comes to going electric. The grid infrastructure may be in place on a street for one home in a neighborhood to make this conversion, but if multiple homes convert at the same time, it could quickly overrun the safe load for the area.

Experts note that it is possible to increase electric demand suddenly and dramatically in a way that a neighborhood grid can't easily handle. Typical cases that are causing the most problems so far, however, are not related to induction cooktops or heat pumps. They're happening in homes that are charging electric vehicles, or using home wiring systems that don't include upgraded panels."

Furthermore, it's much easier to electrify new structures than to retrofit existing ones. For example, while the Inflation Reduction Act will provide incentives for home and building owners to make certain efficiency and electrification upgrades, the reality of retrofitting is complex at best and daunting at worst—especially in today's zany building market.

And then there are the pervasive labor challenges. Steve Easley, internationally esteemed building scientist and owner of the [ReVISION House Scottsdale](#), says he's had a hard time finding subcontractors that will consider using best practice building techniques and install advanced technologies needed to electrify



homes. “Many times during the course of our project, we have heard ‘we don’t do it that way,’ or ‘we only use materials that we are familiar with,’” Easley notes. “The subs have no problem walking away from work that requires them to do anything different from what they are used to. Because of the massive unmet demand for housing, I don’t see this issue going away anytime soon.”

Ultimately, Easley obtained the subcontractors he needed to accomplish most of what he wanted, but it added quite a bit of time to the project. “If you’re building homes,” he advises, “be sure to factor in the additional time it takes to find cooperative subs.”

ONWARD AND UPWARD

Despite these challenges, electrification technologies are rapidly becoming more cost effective and reliable than fossil fuel systems in most markets and climate zones across the country.

Home tech has become much more widespread, as has knowl-

edge. For example, not only are induction stoves twice as energy efficient as gas stoves, which saves on utility bills while reducing carbon output, but they also contribute to better indoor air quality.

And, optimal design is providing builders with more bang for their buck. This includes optimal solar orientation, and use of thermal mass (especially in hot regions), overhangs and shading. There is also energy-efficient building envelope assembly, such as wraps or tape, insulated sheathing, insulation, high-performance windows, insulated doors, cool roofs and weatherization systems.

Venture capital and private investment funds are also playing a key role in scaling innovative electrification solutions, helping to spur development, accelerate adoption, increase output, and decrease production costs. This will be good news for all-electric housing: The market growth for electrification technologies is expected to skyrocket from \$2.4 billion in 2020 to \$12.9 billion in 2029. **GB**



Market rules. Sustainability is a hot topic with investors due to the financial benefit of supporting an environmentally friendly business.

THE ESG Era

► Part 3:



CORPORATE ADHERENCE TO SUSTAINABILITY IS MAKING GREEN REAL ESTATE INTO AN INVESTOR'S WORLD.

BY GREEN BUILDER STAFF

Over the past decade, corporations of all types have taken up a sustainability cause, whether it be in the way they manufacture products or how they train employees to act and think green.

A lot of that action stems from some prodding by investors, who increasingly are using a company's Environmental, Social and Governance (ESG) as a key justification for opening up their wallets.

Environmental criteria consider how a company safeguards the environment, such as with corporate policies that address climate change. Social criteria examine how the company manages relationships with employees, suppliers, customers, and the communities where it operates. Governance deals with a company's leadership, executive pay, audits, internal controls, and shareholder rights.

According to Annabel Bosman, managing director of relationship management for RBC Wealth Management, the ESG investment theme isn't new—especially with her company. “Even before the virus crisis hit, sustainable investing was becoming a hot topic with investors across the board, and it's been in the RBC ethos for a long time,” she says. “Our central mantra is to help our clients thrive and communities prosper. To do that, we all believe we should focus on sustainability.”

ESG IN REAL ESTATE

Investment and construction experts agree that ESG has become an important criteria in real estate investing and community development to reduce risk, augment value, and enhance resilience. “Once upon a time,

real estate embodied the epitome of capitalism. The trend, however, is growing quite the opposite way,” notes Deloitte partner Francisco Da Cunha in the company's 2021 report, “The Impact of Social Good on Real Estate.” “Awareness is growing that real estate can have a significant social impact through the form of rehabilitation of public spaces, affordable housing, social housing, and care centers, or through an environmental focus on investment in new buildings such as green buildings.”

Aside from fostering eco-friendly buildings, ESG also allows consideration of the impact of properties on the community, covering aspects like diversity, according to Da Cunha. “The real estate industry must respond to this challenge by creating opportunities through social impact investing, like multi-tenant shared spaces or the transformation of underutilized buildings into enthusiastic venues,” he notes. “In practice, the major obstacle is that investors will need to reinvent their traditional investment models to match the needs of the local community.”

Amy Menist, an audit senior in the firms Real Estate Services Group and the Construction Services Group, notes that high-performing green buildings are good for the environment and the bottom line. “Companies that invest in ESG initiatives often see a quick return because high-performing buildings attract higher occupancy rates, thereby generating more revenue and decreasing the amount spent on utilities, insurance premiums and repairs due to severe-weather-related events,” she notes.

There are incentives available at the federal and state levels which are issued to businesses to help make the initial investment more attractive, Menist adds. “Businesses today should assess their building portfolios, evaluate their alignment with industry benchmarks and leading practices, evaluate future trends and possible policy changes, and identify gaps and

- **\$17.1 trillion: Investor assets for ESGs in 2021**
- **\$12 trillion: Investor assets for ESGs in 2020**

SOURCE: U.S. SIF Foundation

THE STATE OF SUSTAINABLE BUILDING 2023



opportunities,” she notes. “With a thorough understanding of the company’s current position, its plans and stakeholders’ expectations, management can prioritize goals and set efficient ESG targets.”

THE TECHNOLOGY NUDGE

New technology is helping fund managers keep pace with this sharp rise in demand for sustainable investments. Jennifer Wu, an investment specialist from J.P. Morgan Asset Management, notes in “ESG Outlook 2022: The future of ESG investing” that the internet is being transformed in the way information is captured, documented and disseminated. “This provides investors with access to more data than ever before,” she notes. “However, it’s only now, with the development of artificial intelligence (AI), that investors have the ability to analyze it all.”

The result has been a dramatic improvement in corporate transparency, as new data sources provide better insights into how companies are being run from an ESG perspective, Wu adds. As fund managers use AI to tap into the “big data” revolution, new and exciting opportunities are being created across an ever-growing range of sustainable strategies.

REQUESTED (AND REQUIRED) COMPANY PARTICIPATION

Wu notes that many companies worldwide already understand the need to take action on ESG issues—not the least because “they recognize that they can only deliver sustainable long-term growth if they manage the Earth’s resources prudently, treat their workers with respect and look after the natural environment in which they operate.”

However, because the E, S or G issues that matter to one company will differ from those that matter to another, corporate engagement is vital if investors are to encourage companies to take action where the greatest impact can be achieved, Wu notes. Similarly, engaging with sustainable laggards to encourage change can be “much more effective than simply divesting.”

Also, governments continue to have a key role to play. Supportive government policy and coherent regulation can be vital to encourage companies to meet their ESG obligations and to also convince investors of the long-term viability of sustainable investing, Wu adds.

STOCK OPTION

In terms of popularity, ESG has an unusual ally: a slowing economy. Pre pandemic, companies with good ESG ratings that achieved superior financial results attracted huge investor interest, according to Stephen Metcalf, RBC’s associate global manager of research. This pushed stock prices up and made the shares expensive. But the up-and-down market of the past year, and resultant lower asset prices, has made ESG stocks better value for long-term investors wanting to increase their sustainable investing exposure. “If you’re looking at a 10-year investment horizon, they’re relatively cheap now,” Metcalf says. “In other words, now could be a rare moment to add some quality ESG companies to a portfolio.”



Generation next. Continued growth of ESG will depend upon interest by younger generations—Generation X, the millennials and eventually Generation Z—which are expected to be twice as receptive as their older Baby Boomer and Silent Generation peers.

YOUTH MOVEMENT

Another ESG growth factor will likely be one for a long time: the younger generations. The Economist Intelligence Unit (EIU) defines these groups as people in Generation X and the Millennial generation, born between 1965 and 2000.

In some cases, it’s the kids who are convincing investors to ensure that their entire portfolios have an ESG stance, according to Bosman. “One client was doing this at the insistence of their young daughter,” she notes. “She wanted to know what they were doing to save the planet.”

According to EIU research, 76 percent of younger generation members surveyed say it’s “increasingly important” to consider ESG factors when investing, compared to 37 percent of older generations—namely, Baby Boomers or people in the Silent Generation, born in 1964 or earlier.

ESG discussions with children can lead to other sustainability-related topics, such as supporting social agendas or fighting climate change, Bosman adds.

Ultimately, trends driving the need for sustainable business practices are here for the long term, according to Metcalf. “Obvious long-term themes include the move away from fossil fuels to renewable energy,” he says. “But there’s also an increased use of artificial intelligence and new technology to help care for an aging population and keep the environment clean.”

According to Wu, increasing investor interest, a sharper corporate focus and a significant improvement in data provision are all set to further support the growth in sustainable investing. “There remain obstacles to overcome—both in terms of investor acceptance and corporate adoption,” she notes. “But with new ways to capture sustainable returns being developed, and with many more companies committing themselves to sustainable business goals, it’s easier than ever for investors to mitigate ESG risks in their portfolios while contributing to positive change.” **GB**

► **Part 4:**

A Pandemic Epilogue?

PRE- OR POST-COVID-19, DEALING WITH LABOR AND SUPPLY ISSUES IS AS CHALLENGING AS EVER.

Slow- or no-growth. The number of workers in various construction fields is expected to climb very slowly in some fields, and decline moderately in most others, through the start of the 2030s.

BY GREEN BUILDER STAFF

New year, same problems—and then some. That's the consensus of several experts as they evaluate the construction industry and the challenges it will face in 2023. In this first “nearly normal” year after the pandemic, expect a similar but narrowed down slate of issues to contend with, including labor availability, supply issues, and a cooling housing market.

The key to coping with these issues? Adaptability, according to Howard Frederick, a partner at The Platta Law Firm in New York City. “As restrictions in the construction industry are slowly beginning to lift, there is an overwhelming consensus that work policies and procedures will not be the same as they were before the pandemic,” he notes, in a report on [ForConstructionPros.com](#). “However, by better understanding and addressing the changes ahead, contractors will be better prepared to overcome the various, new challenges they can expect to encounter.”

WHERE IS EVERYBODY?

Hard as it might be to believe, the labor shortage was less-pronounced in 2022, with hirings trending upward during the year. Data from the U.S. Bureau of Labor Statistics indicates that the unemployment rate in the construction industry dropped to 3.4 percent in September, the lowest level since September 2019—a half year before COVID-19-induced lockdowns began. By April 2020, the rate reached its peak of 16.6 percent; that titanic number dropped as the industry gradually went back to work.

But the number of people out of work isn't the real problem, according to David DeSilva, head of construction at [The Hartford](#), a construction insurance provider in Hartford, Connecticut. The challenge is to find people who want to come back to work.

Hartford's report, “Construction Industry Trends in 2022: The Talent Shortage,” notes that pre-pandemic, labor was already a growing concern. “There were more workers leaving the field than entering it,” DeSilva says. “The pandemic really accelerated this shift of workers retiring or changing careers.”



On the rise. Overall, job openings in construction fields have moved in an upward manner during 2022, and are making up a larger percentage of all available jobs nationwide.

Job Openings in the Construction Industry, 2021-2022

	September 2021	May 2022	June 2022	July 2022	August 2022	September 2022
Industry Total	348,000	405,000	353,000	353,000	386,000	422,000
Percent of All Jobs	4.5	5.0	4.4	4.4	4.8	5.2

SOURCE: U.S. Bureau of Labor Statistics

The culprits are many. Baby boomers, who currently make up 25 percent of the U.S. workforce, are rapidly retiring. The National Center for Construction Research projects that 40 percent of this group—roughly 16 million workers—will collect their gold watches during the next 10 years. Generation X is still solidly in the workforce but aging. Millennials, who rival baby boomers in workgroup size, spearheaded the Great Resignation and, according to a 2019 report by the [U.S. Chamber of Commerce](#), don't consider construction to be a worthwhile career industry.

There's also a stubborn aftermath of the Great Recession: In 2008, 630,000 workers permanently left the construction industry, according to Michel Richer, content marketing manager at workforce management software maker [Bridgit](#).

This doesn't make life easy for the industry. Having fewer workers gives companies fewer choices on the number and types of projects they can bid on. And, meeting contract agreements and completing projects on time becomes harder if companies lack skilled professionals, according to Richer. He also notes that a 2020 survey by [Associated General Contractors of America](#) (AGC) and Autodesk revealed that during the pandemic, 60 percent of companies had to postpone or cancel at least one scheduled project.

Worker efficiency and workmanship are also affected. Laborers

may rush to finish a project on time or quality may suffer because of an employee's inexperience, DeSilva adds. "Workers who are less tenured or new to construction don't have the background or experience that's often needed to complete a job the first time," he notes. "With less workers in the field, there are higher demands that are put on the workers that are left. This leads to workmanship issues and mistakes."

Skilled laborers can be asked to take on more work, which can lead to job burnout and more workers changing careers, Richer notes.

WHERE'S MY STUFF?

Of course, having enough people to work a job doesn't mean a lot if there's nothing to build it with. During the early months of the pandemic, many contractors were unable to source basic materials—such as sand, cement, and bricks—while also suffering from labor shortages. This will eventually drive up costs significantly at one point, according to New York City-based insurance broker and risk advisor Marsh.

"For many contractors, paying suppliers early has proved critical, and is likely to remain more of a priority post-pandemic," the company reports. "Often, smaller subcontractors are least able to carry risk, so paying them early may help to ease some cash flow challenges in a changing environment where being

Five Ways to Track Down New Talent

Pandemic or no pandemic, labor acquisition and retention has been a headache for the construction industry. While there's no quick fix, there are several things an employer can try to help handle a skilled worker shortage. Michel Richer, content marketing manager at workforce management software maker **Bridgit**, offers the following tips:

IMPROVE THE COMPANY CULTURE. With construction viewed as an unappealing industry for younger generations, contractors need to improve their company culture, and in doing so, improve the culture of the industry in general. Two ways include: Asking for more feedback from the company's workforce, which gives them a chance to voice any concerns, and lets them know that their input is valued; and rewarding team members that engage in the company values, which sets the standard for the rest of the team.

LOOK TO DIFFERENT SECTORS. A drop in employment at non-residential construction companies could mean a bounty of skilled workers for recruiting. Offering opportunities for gainful employment and career development can help pull in workers that had to be let go due to construction slowing down.

TAP THE FEMALE WORKFORCE. According to the Bureau of Labor Statistics (BLS), women make up only 10.3 percent of the construction workforce, and only 1 percent of workers on a building site are female. This is a massive talent pool that the construction industry should focus its attention on.

BREAK DOWN LANGUAGE BARRIERS. BLS data also indicates that construction has a huge foreign language gap, with more than 30 percent of the workforce being solely Spanish speakers, and 40 percent of companies reporting that they do not have any on staff. Employers can try to overcome this barrier by offering language training and even making language proficiency a requirement during the hiring process. This also creates an inclusive culture that is more appealing to non-English speaking workers and greatly expands the available talent pool.

GET CREATIVE. Construction workers are often considered to be "occupational athletes"—people that physically move around to work and earn a living. Why not try recruiting actual athletes? Thousands of physically gifted young athletes that have given up on their dream of making "the show" enter the workforce every year.

able to mobilize quickly is vital."

Like most companies, contractors will reevaluate their supply chain management to minimize future interruptions. Many companies are looking to engage with a smaller number of well-aligned organizations, Marsh reports. They will also look more closely at where their extended supply chains are based—including, where possible, suppliers of their suppliers; seek to diversify them; and avoid having too many suppliers concentrated in any one area.

Some companies may also seek to bring their suppliers closer to home. "Overall, creating a flexible supply chain that can adapt quickly to engage alternative suppliers will be key for contractors post-pandemic," Marsh notes.

Meanwhile, delivery times for products were severely impacted at the start of the pandemic in early 2020, and things haven't improved much. But 2023 could be a better story. For example, U.S. port delays had a historical turnaround time average of 3.5 days pre-COVID-19; in 2021 the delay sat at nearly 6 days, according to a report by Pleasanton, California-based accounting firm Sensiba San Filippo. The turnaround time will be closer to 5 days by the end of this year. "Factors like these have dampened performance in the past," the company notes. "But things should improve as inventories are replenished and more projects are scheduled for completion. We can also expect companies to adjust their logistical needs to face these disruptions."

PLEASE BE PATIENT

Worker shortages, lack of product, and extended delivery times add up to one unhappy thing: A longer-than-expected completion time. Stories abound about housing projects that were expected to take less than a year to build instead ended up taking at least twice as long. The timeline might not be that skewed in 2023, but it's definitely not going to be like the "good old days" of 2019 or earlier, experts note.

"Construction site safety changes, in addition to the increased worker and supply chain demands, will undoubtedly add to the amount of time it will take to finish projects," Frederick notes. "It would behoove contractors to keep these added time constraints in mind when bidding out new jobs to ensure a realistic schedule is implemented."

That could put an end to a popular way of speeding up construction time: fast tracking, where building starts on a project before its design has been finalized. The practice will be virtually nonexistent in the foreseeable future, according to Richer. "Simply put, contractors will need to establish longer project timeframes," he notes. "All members of the project team, including architects, owners, subcontractors and other consultants, must embrace the reality that projects will simply take more time than they did in the past." **GB**

Rising sun. The IRA legislation increases the federal Clean Energy Credit by up to 30 percent of the total cost of a home solar panel or battery storage system if the installation occurs between January 2022 and December 2032.

THE STATE OF
**SUSTAINABLE
BUILDING 2023**



Climate Action

► Part 5: Reaction

DESPITE A FEW GRUMBLES, PRESIDENT BIDEN'S NEW LEGISLATION HAS A LOT TO OFFER THE CONSTRUCTION INDUSTRY.

BY GREEN BUILDER STAFF

An enormous boost to carbon reduction came in August when President Biden signed the Inflation Reduction Act of 2022. The \$485 billion bill, which represents the single largest infusion of federal cash aimed at tackling the climate threat in U.S. history, allocates \$369 billion to reduce domestic emissions to approximately 40 percent below 2005 levels by 2030.

That's a "meaningful increase" when compared to America's current path, which would have led to a 25 percent reduction by that time, according to Brian Murray, interim director of the Nicholas Institute for Energy, Environment & Sustainability at Duke University.

"This is very much climate legislation," Murray says. "The bill offers a significant bump in the nation's projected ability to reduce our greenhouse gas emissions."

The legislation's centerpiece is electricity, the generation of which is the nation's biggest source of greenhouse gasses. "Every part of the economy has energy running through it—it literally "powers everything in our lives," says Abigail Dillen, president of nonprofit environmental watchdog Earthjustice. "How we source that energy has a massive impact on the planet."

BUYING POWER

The bill encourages homeowners to electrify their homes by offering up to \$14,000 to install advanced technologies and make energy efficiency improvements. Incentives include:

- Up to \$8,000 in rebates and up to \$2,000 in tax credits for heat pump technology for space heating and cooling
- Up to \$4,000 in rebates for smart electric panels
- Up to \$2,500 in rebates for updated electrical rewiring
- Up to \$1,750 in rebates for all-electric water heaters



Electric era ahead? The IRA provides numerous incentives to encourage homeowners to upgrade to energy-efficient electric appliances.

- Up to \$1,600 in rebates for insulation, air sealing and ventilation upgrades
- Up to \$1,200 in tax credits for energy efficient windows and doors upgrades
- Up to \$840 in rebates for electric stoves and electric heat pump clothes dryers

Some homeowners won't qualify for the tax credit or rebates depending on annual tax bills and household income. For example, rebates are not available to households earning over 150 percent of an area's median income (AMI).

The bill extends certain tax credits for homes, including \$2,500 for homes that meet the eligibility standards of the EPA's ENERGY STAR Single Family New Homes Program, and \$5,000 for homes that are certified to meet the U.S. Department of Energy (DOE)'s Zero Energy Ready Home (ZERH) program.

The legislation also extends the federal Solar Investment Tax Credit (ITC), now called the Clean Energy Credit, and increases the tax credit amount up to 30 percent of the total cost of a home solar panel system or battery storage system if the installation occurs between January 2022 and the end of 2032.

In addition, \$1 billion in grants has been allocated to make affordable housing more energy efficient.

JOB GENERATOR

To address labor issues that are plaguing the building industry, the bill allocates money for states to create programs to train contractors on products and processes that make homes and buildings net zero, electric, and resilient.

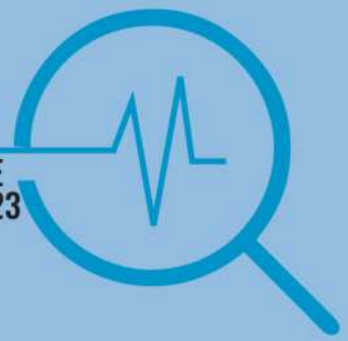
The bill invests in solar, wind, battery storage, geothermal, hydrogen, and other renewables, and provides federal funding in the form of

A CLEAN ENERGY ECONOMY

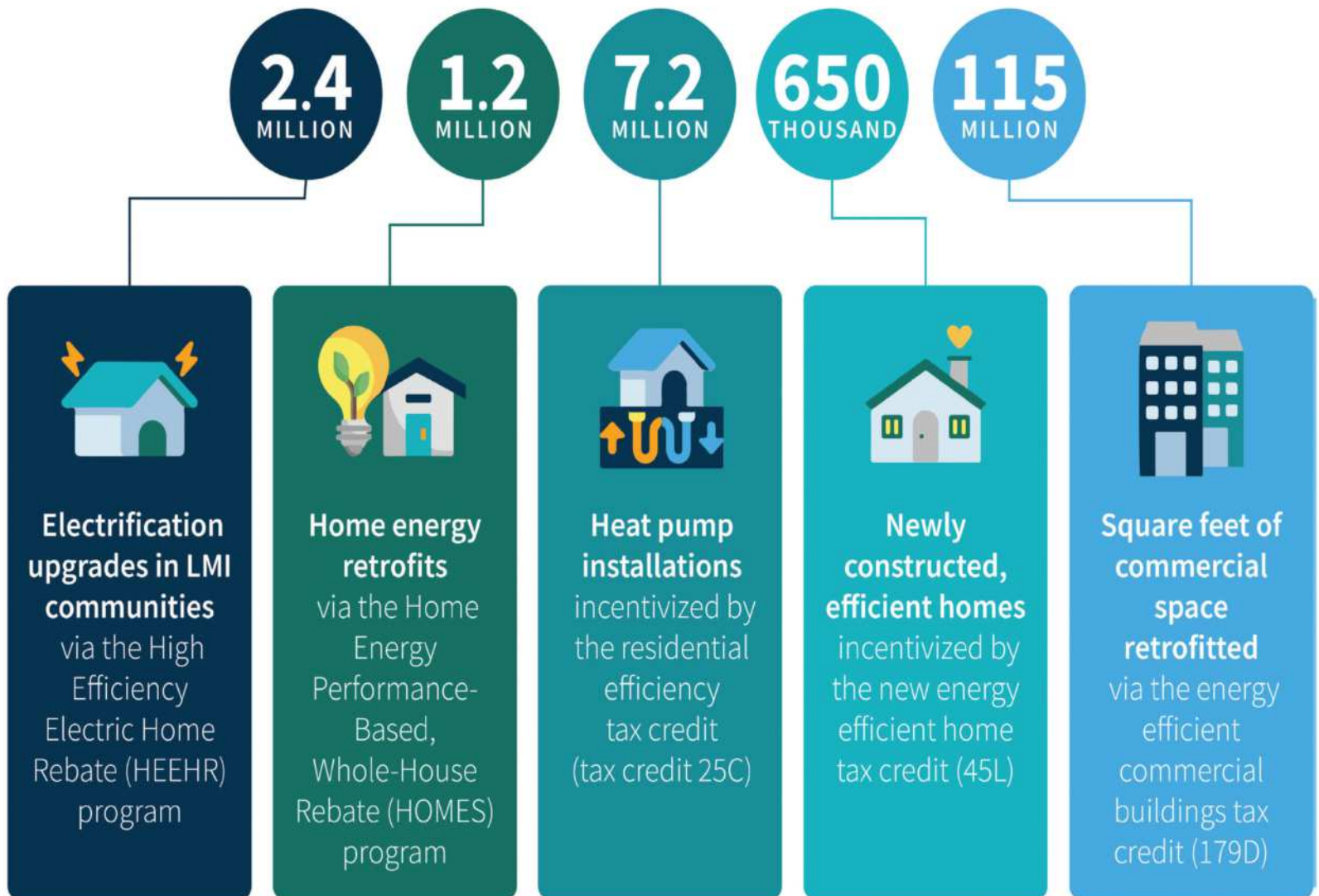
BY 2030, THE INFLATION REDUCTION ACT IS EXPECTED TO HAVE A MAJOR IMPACT ON THE STATE OF CLEAN ENERGY, INCLUDING:

- 950 million new solar panels
- 120,000 new wind turbines
- 2,300 new grid-scale battery plants
- 42 million people benefitting from additional clean energy projects
- 2 million acres of more climate-resilient forest

SOURCE: WHITE HOUSE PRESS OFFICE

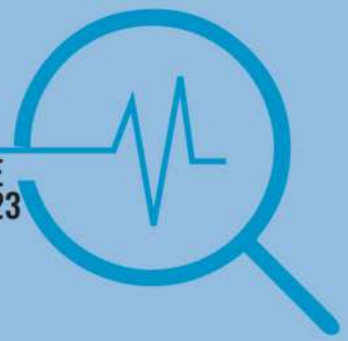


The IRA could transform the buildings sector:



Benefits galore. The Inflation Reduction Act's impact on building will be far-reaching, including electrification, retrofits and heating. CREDIT: RMI





grants and loans to expedite the development of new grid infrastructure and transmission lines to deliver clean power to customers.

Billions of dollars in tax credits will also be offered for domestic manufacturing of photovoltaics, batteries, wind turbines, electric vehicles, and critical minerals, and the creation of clean jobs will be prioritized in fossil fuel producing markets.

And, the bill aims to make electric vehicles (EVs) more accessible by offering \$7,500 rebates for new EVs and \$4,000 for used vehicles.

THE USUAL FANS AND DETRACTORS WEIGH IN

Reaction to Biden's bill has been mixed, but you get the sense that even the naysayers know they're splitting hairs in criticizing cascade of incentives that will be pouring into the housing sector, and raising the sustainability bar.

U.S. Green Building Association CEO Peter Templeton says the act will "have a profound impact on communities across the country and will be marked in our history as a turning point in our climate fight."

Greenpeace applauds the legislation for as far as it goes. It notes that the IRA authorizes billions of dollars in sorely-needed investments for renewable energy projects and technologies like electric vehicle infrastructure, heat pumps, and advanced grid technologies. But, it "fails to address the root causes of the climate crisis—extraction and burning of fossil fuels."

Ben Brubeck, vice president of legislative and political affairs for Associated Builders and Contractors of America, says the IRA will "disrupt the marketplace of contractors who successfully and safely build solar, wind, electric vehicle charging stations and other clean energy projects across America."

The National Association of Home Builders (NAHB) calls the final package a mixed bag for housing and NAHB members. "The IRA's biggest flaw," says Jim Tobin, NAHB's chief lobbyist and EVP for government affairs, "is the lack of any money to alleviate the housing supply crisis." **GB**

Golden green. President Joe Biden's signing of the Inflation Reduction Act in August 2022 ushered in a new series in most cases of environmentally friendly regulations and incentives.

COURTESY OF WHITE HOUSE PRESS OFFICE

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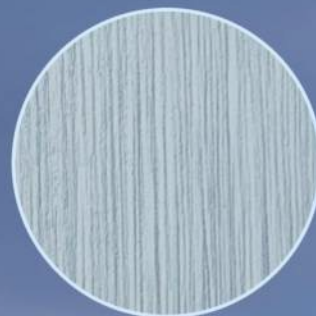
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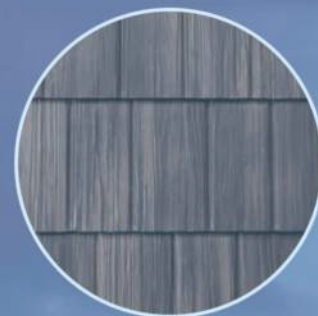
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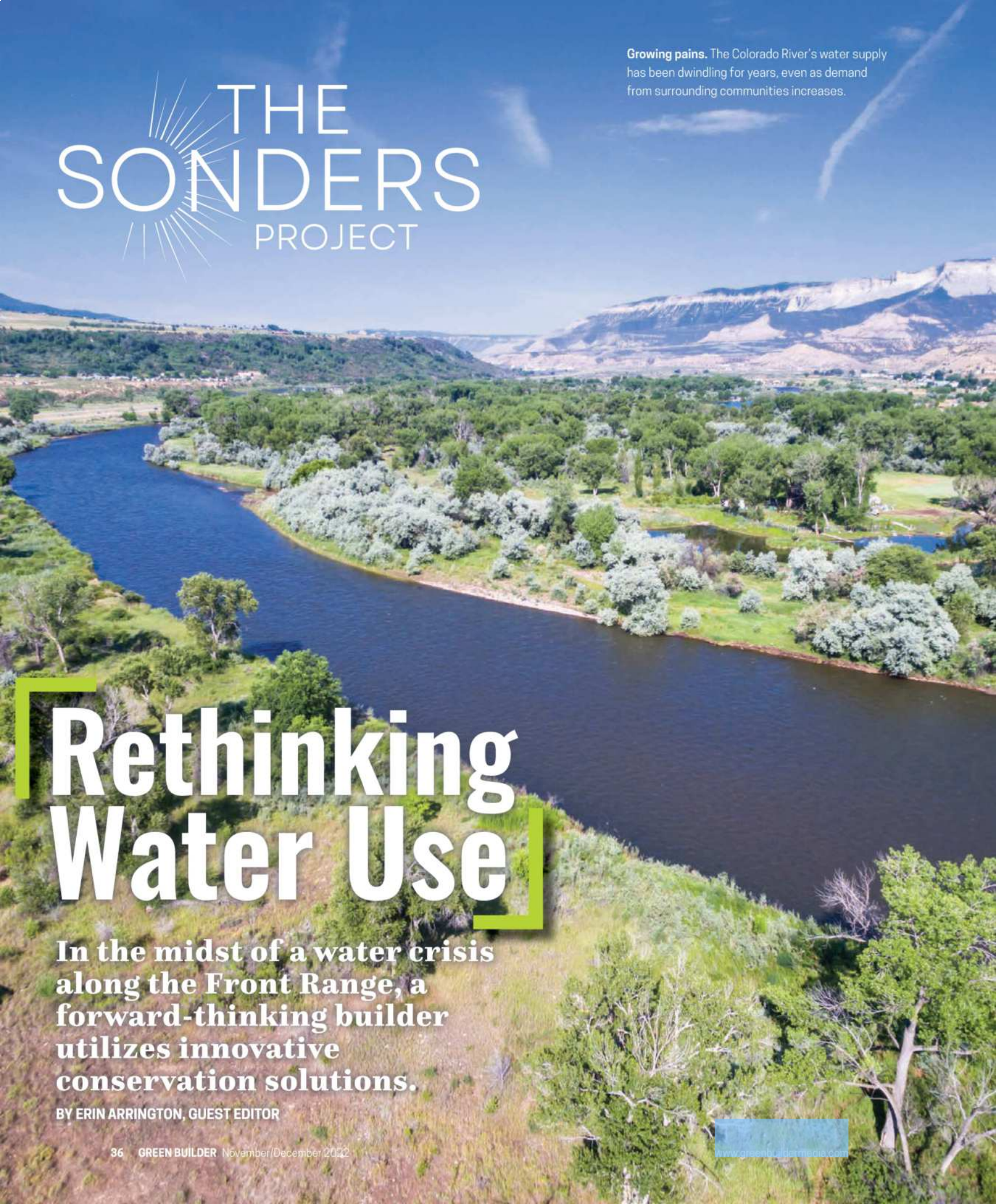


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THE SONDERS PROJECT

Growing pains. The Colorado River's water supply has been dwindling for years, even as demand from surrounding communities increases.

Rethinking Water Use

In the midst of a water crisis along the Front Range, a forward-thinking builder utilizes innovative conservation solutions.

BY ERIN ARRINGTON, GUEST EDITOR

Cities and towns along Colorado's Front Range, including Fort Collins, have been on the edge of a water crisis for years. These areas rely on the Colorado River as a primary water source, and in recent decades, the river's supply has been steadily decreasing as demand continues to increase. Colorado is taking a multi-pronged approach to address this disparity, including **building two new water storage reservoirs along the river** and, in conjunction, enacting stringent conservation measures.

Fort Collins Utilities, one of the main water utilities in the Fort Collins area, has **created a number of incentive-based conservation programs for its residents**, including indoor water efficiency rebates and irrigation rebates. The utility has also encouraged residents to use the **MyWater** portal, which offers leak detection and water usage monitoring.

When it comes to new developments, the city has honed in on ensuring that the future of Fort Collins will have a high standard for water conservation. In addition to requiring all developers to submit comprehensive conservation plans, the area's water supply requirement fee skyrocketed (the fee increased from \$42,500 per acre-foot in 2021 to \$68,200 per acre-foot in 2022).

Although it can be a challenge for new builders, Fort Collins' prioritization of water conservation appears to be making a difference. According to Fort Collins Utilities, the Utilities' Water Conservation program is nearly 40 years old. "Efforts have reduced water use from 248 gallons per capita per day in the 1980s to 139 gallons per capita per day in 2021," the utility notes. In contrast, **the Environmental Protection Agency (EPA) says the average American household uses about 300 gallons of water per day**.

The commitment to conservation is also attracting like-minded developers such as Colorado-based Actual Communities Inc. Its current project, Sonders Fort Collins, addresses energy and water conservation on a holistic, community-wide level. Although the project will technically be served by the ELCO Water District, the district adjacent to Fort Collins Utility, the developers say they were drawn to build in a community that is similarly forward-thinking in its approach to water usage.

WATER-CONSCIOUS LANDSCAPING

Sonders Fort Collins is an age-targeted community that, in addition to a few hundred homes, will include a variety of amenities for its residents—including at least three parks, a community center campus (the Sonders Learning Center), and an extensive trail system.

In the planning stages of the project, developer Actual Communities Inc., strategized ways to reduce water consumption on a community-wide level. Bill Swalling, the company's principal and founder, says that Sonders utilizes xeriscaping—landscaping that requires little to no irrigation thanks to exclusively native plants.

"We're going to provide a lot of native grasses so that at some time in the future, you can turn off the water supply to those native grasses and native trees," Swalling says. "We've successfully done this in two other locations in Denver."

www.greenbuildermedia.com

Because many homes at Sonders will likely be purchased by empty nesters, the builders decided to make individual lot sizes smaller in favor of dedicating more space to public parks and green belts. In general, homeowners tend to overwater their lawns. And, since the community is age-targeted, the developers wanted to make sure homeowners weren't burdened by the maintenance of large yards. In turn, sacrificing individual homes' yard space for more community space reduces the amount of yard maintenance that falls to individual homeowners while creating more organic meeting spaces that foster community.



Sensible thinking. Homes at Sonders Fort Collins utilize native plants to help reduce water use. COURTESY OF SONDERS FORT COLLINS.

INNOVATIVE IRRIGATION

For more than eight years, Actual Communities has been working with Hines Inc., a Fort Collins-based irrigation design company, to create a system that will maximize the community's water efficiency. The holistic system they came up with minimizes the need for maintenance and human interventions largely through soil amendments specific to plant type.

"A huge driver of plant health and water conservation is soil quality," says Hines Inc. President Nate Hines. "You can think about soil kind of like you think about the human digestive system. When you have lots of good organic material—[where]



Greater outdoors. The Sonders community will have smaller individual lot sizes in favor of more gardens, including the Flourish Park community garden.

COURTESY OF KGA STUDIO ARCHITECTS

you have worms [and] you have micro biotic bacteria that lives in the soil—when all of those processes are happening, a plant more easily stores more air, water and nutrients. You have to irrigate less.”

Focusing on soil quality will also help prevent heavy use of chemical fertilizers down the line. “A heavy dependence on chemical fertilizers kills all those nice good living things in the soil,” Hines says. “And when you kill everything in the soil, the structure of the soil falls apart. It holds less water, and it’s harder for plants to thrive. So then you start putting more chemicals on to push growth. It’s a bit like getting addicted to steroids.”

In the grassy areas around throughout Sonders, the top foot of soil will include organic soil amendments and compost that function as water storage under the landscape. The irrigation system will also allow Hines Inc., which will continue to maintain the system after it’s built, to pump soil amendments and nutrients through the irrigation system itself. This system reduces the need for any fertilizer by about 80 percent and essentially eliminates chemical fertilizer runoff into stormwater rivers and streams.

Using artificial intelligence, Hines Inc. will also be able to monitor the system for leaks or breaks in real time. Compared to the average development of a similar size, Sonders will be able to maintain three times the amount of green space while reducing water use by about 60 percent, based on the company’s predictive models. And, going forward, Hines Inc. plans to use the irrigation system designed for Sonders as a template for new developments around the country.

“I tell all of our investors that we’re not in land development, we’re in water development. Water is so expensive, and we need to conserve it and use it properly.”

—Bill Swalling, principal and founder, Actual Communities Inc.

TEAM LEADERS

PRIMARY BUILDER Thrive Home Builders

DEVELOPER Actual Communities Inc.

PEOPLE



GENE MYERS
Visionary of
Sonders Fort
Collins and
founder of Thrive
Home Builders



BILL RECTANUS
Chief operating
officer of Thrive
Home Builders



ERIC SUNG
Director of
design at Thrive
Home Builders

SMART LEAK DETECTION

**PHYN'S SMART WATER SYSTEM HELPS
HOMEOWNERS KEEP LEAKS IN LINE.**



The EPA estimates that nationwide, household leaks waste approximately 1 trillion gallons of water annually. *The Phyn Plus* smart water assistance and shutoff system comes with an app that makes it easy for homeowners to stay on top of their entire water system.

One way the system does this is through advanced leak detection that's supported by HD pressure and ultrasonic flow sensing technologies. If an issue is detected, users receive notifications through the app, and users even have the ability to shut off their water system remotely.

The app also provides homeowners with data about how much water their family is using day-to-day, even down to individual fixtures. Users can analyze their own use over time, as well as compare their habits to that of the average household.

"Phyn's advanced AI learns each household's unique water usage patterns and provides tailored water conserving insights and near real-time leak detection, along with the tools to empower homeowners to incorporate sustainability into their everyday lives," says Phyn CEO Ryan Kim.

Metro-Minded

WHEN IT COMES TO SONDERS FUNDING, ACTUAL COMMUNITIES HAPPILY WENT FOR A METRO DISTRICT.

In the planning stages of Sonders Fort Collins, Actual Communities Inc. had a long list of amenities it wanted to implement for residents and resource-saving systems that would benefit the city as a whole. However, the builders needed a funding solution.

Typically, the costs of community-wide amenities are built into the price of individual homes. In the case of Sonders, however, they didn't want Sonders' first round of homebuyers to have to foot the bill for systems that will benefit residents for decades to come. In turn, they pursued creating a metro district for Sonders Fort Collins.

According to the Colorado Association of Home Builders' website, "Metro districts are independent governmental entities formed to finance, design, acquire, install, construct, operate and/or maintain public improvements that are not otherwise being provided."

Actual Communities Inc. principal and founder Bill Swalling says the approval of a metro district is what allowed them to afford the community garden, comprehensive irrigation system, and extensive trail system. Funding from the metro district is spread over 40 years, ensuring that the shared community numerous parks and services will be maintained long after the first families move in.



CONSERVATION IN THE HOME

In addition to Sonders' community-wide water conservation measures, the homes at Sonders will utilize a variety of water-saving techniques. About 220 of the homes will be built by Thrive Home Builders—all of whose homes are LEED and ENERGY STAR certified.

According to Bill Rectanus, Thrive's chief operating officer, all homes at Sonders will be outfitted with low-flow and EPA WaterSense-certified fixtures, including faucets, showers, and toilets. On average, WaterSense-labeled faucets are 30 percent more efficient than typical faucets, and WaterSense showerheads save about four gallons of water per shower.

Additionally, the model homes at Sonders, which include extra efficiency features, will run on hybrid heat pump water heaters and switch-driven recirculation pumps. This system, Rectanus said, minimizes water loss by eliminating the amount of time homeowners typically run water while waiting for it to get



hot. And, using a switch rather than timers reduces energy consumption by not constantly running it in the background.

The homes built by Thrive will include products by Uponor and Phyn, two sustainability-driven companies that are partnering with Thrive in the Sonders project: The *Phyn Plus* smart water assistance and shutoff system allows homeowners to track their water usage in great detail and provides leak detection that immediately notifies users when something needs attention. Additionally, Uponor's *AquaPEX* plumbing system includes less pipe and fewer connections, shortening wait times for hot water and reducing the amount of excess water run by homeowners.

Between their in-home interventions, innovative irrigation system, and environment-protection measures, Actual Communities and its partners hope to build a community that represents the future of homebuilding in water-strapped Colorado. **GB**

Into the light. Homes at Sonders Fort Collins offer a variety of energy- and water-saving features, including a solar power system with a backup battery, energy-efficient appliances, and WaterSense-certified fixtures.

COURTESY OF SONDERS FORT COLLINS

Off-Grid



Wild Abandon

As the first phase wraps up, here's what makes Green Builder Media's VISION House Mariposa Meadows project so eye-popping.

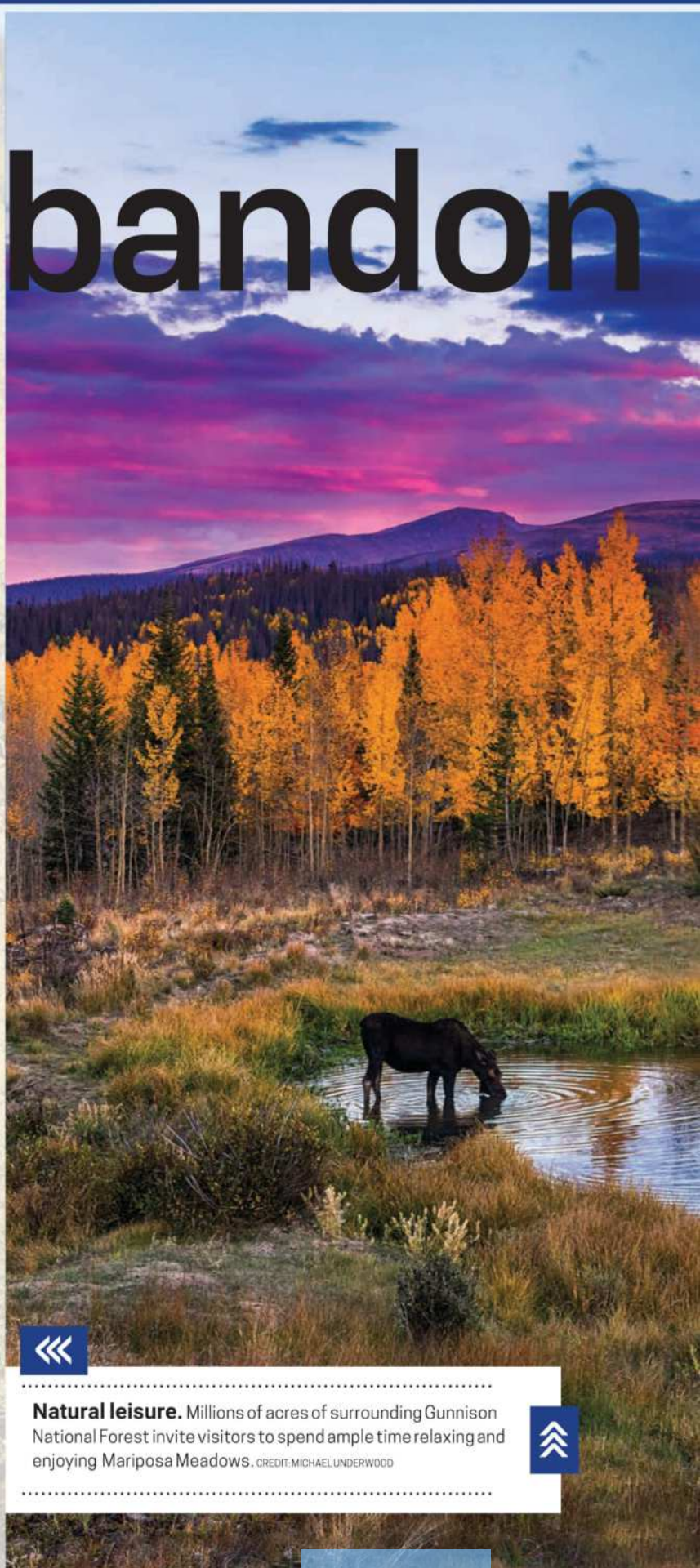
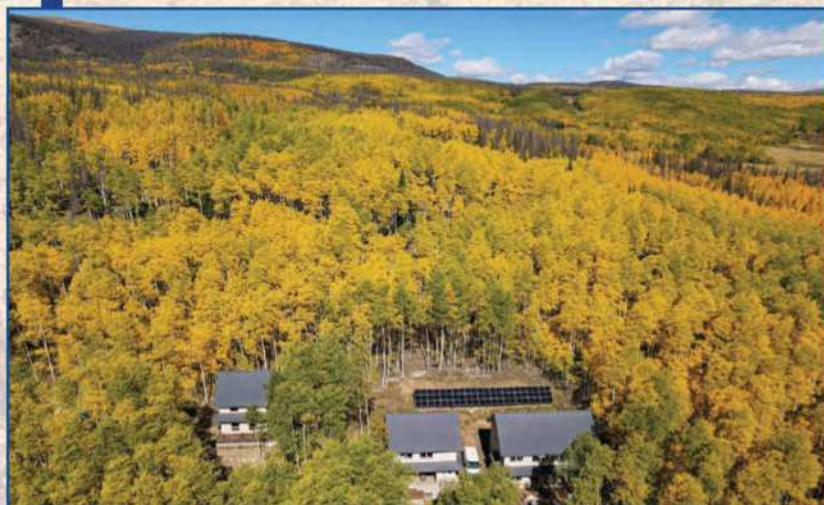
BY SAMANTHA CARLIN

Starting with the small grove that signifies the beginning of fall, the aspen leaves transform from lively green to a combination of bright yellow and golden orange as they prepare for the relentless mountain winter. Their contrast with the dark evergreens painted on the mountains adds to the enchantment of VISION House Mariposa Meadows.

Just as the leaves change, phase one of the Mariposa Meadows project is wrapping up at the 122-acre inholding in the Gunnison National Forest. Owners Sara Gutterman and Ron Jones have longed for this moment since purchasing the property in 2014. Aiming to preserve the property's wildness and natural habitat, the pair went on a quest to showcase the possibilities of sustainable building practices.

Currently, there are three buildings on the property—warmly embraced by an aspen forest. Jones meticulously designed the buildings so that each would have a perfect view, unobstructed by the road.

To make this off-grid, net-zero project possible, the homes utilize a collection of top-of-the-line and innovative products from companies committed to protecting the environment. They work in harmony together to form a smart and efficient home system.



Natural leisure. Millions of acres of surrounding Gunnison National Forest invite visitors to spend ample time relaxing and enjoying Mariposa Meadows. CREDIT: MICHAEL UNDERWOOD





MARIPOSA MEADOWS





OUTDOOR LIVING OASIS

Driving up a winding road to a property nestled in the trees instantly gives a visitor a feeling of connection with the outdoors. The expansive 1,500-square-foot deck by Trex invites guests to absorb the surrounding magnificence and embrace the healing powers of Mother Nature.

The neutral James Hardie fiber cement siding, and trim and wainscoting by Creative Mines complement the neighboring aspen trunks and speckled rocks, acting as a continuation of nature's creations. The vertical board-and-batten siding is fire resistant and durable, while its solid color qualities and dimensional stability eliminate cracking and peeling.



ENERGY INDEPENDENCE

Behind the three buildings is an impressive display of JinkoSolar's *EAGLE* bifacial solar panels. The 13-kilowatt array provides enough energy to power the three homes on even the coldest nights. Schneider Electric inverters, a Blue Planet Energy battery storage system, and a Kohler generator enable the buildings to be fully self-sufficient.



NATURAL LIGHT AND BEAUTIFUL KITCHENS

Entrants to each home will notice how light spills in through the sweeping windows. The European-style Tilt & Turn Windows and patio door from EuroLine move in unique positions to make the most of fresh air—rain or shine.



Whirlpool appliances add a sleek touch to the space, with each house showcasing a different finish—stainless steel, white and black. Quartz countertops from Caesarstone, molded with resin and pigments, are subtly textured for a uniquely natural design—sans the environmental impact.

Kohler's faucets and single-basin apron sinks add style and functionality to the kitchens. They are easy to clean and will look like new for years to come.

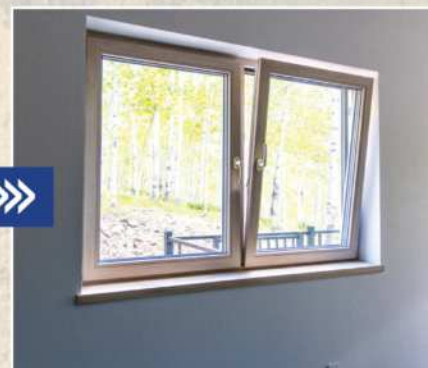
Unparagoned LED light fixtures from Lamps Plus save energy while adding sophistication and elegance to the interior and exterior spaces. Meanwhile, one-of-a-kind dining tables from Deadwood Revival Design display beautiful urban lumber. Once destined for the landfill, these masterpieces celebrate each tree's unique character while storing carbon and giving a second life to quality lumber.



RESTFUL BEDROOMS

The unique finishes and bold grain of Aronson Woodworks furniture add to the natural aesthetic of VISION House at Mariposa Meadows. The hand-finished pieces made from salvaged ash use contrasting paints and centuries-old wood joinery techniques, and are sealed and preserved with low-VOC CLAIZE.

For the bedrooms, Deadwood Revival Design provided custom crafted beds, dressers, side tables, and nightstands. Each piece highlights the wood's natural beauty, including insect holes and burrows, and "live-edge" bed frames.





Delta Millworks provided exquisite engineered wood floors. Each building boasts a different color floor, which ties the room together and brings a sense of calmness.

Accent walls in the bedrooms and sitting rooms were finished with colored drywall joint compound by Fresco Harmony. The walls are tastefully textured, standing out against the adjoining white walls and bringing a sense of serenity to the spaces.



INTERIOR STANDOUTS

TruStile doors are exceptionally designed to be sturdy, aesthetically pleasing, and sustainable. The homes feature paint grade and stained wood interior doors with elegant copper, glass, and leather inserts.

Schlage locks add to the technologically advanced home system. Guests can be provided their own codes, which can be erased once the guest departs. The locks can be accessed remotely by the owners to ensure that doors are locked when the buildings aren't occupied.



An eye-catching spiral staircase provided by Trex in the Aspen Cabin leading to the upstairs bedroom adds a distinct architectural flare.

Lee Industries has provided furniture, including dining chairs, sitting chairs, benches, and a chaise. The pieces are upholstered in beautiful, natural non-toxic fabric and are designed to make a statement.



Fun times filled with singing and dancing are inspired by multiple Sonos speakers throughout each home—using sound therapy to set the mood at the getaway retreat.

As a finishing touch, Jones saved a mount from 35 years ago in the Iris Studio kitchen—a reminder of the multitude of deer, elk, moose, and other animals who call the meadows home. **GB**



VISION House Mariposa Meadows Sponsors



To learn more about the VISION House Mariposa Meadows, visit:

<https://www.greenbuildermedia.com/vision-house-mariposa-meadows>.



NATURE'S FURY

Destruction zone. More than \$1 billion in homes in Florida alone were destroyed in September by Hurricane Ian, one of the most-destructive hurricanes to ever hit the U.S.

AS INSURERS FLEE AND FLORIDA PLEADS FOR FEDERAL REBUILDING HELP, IS THE CONSTRUCTION BOOM OVER? **MAYBE NOT.**

BY MICHELE LERNER

You might think that Damon Vetere and his wife would be ready to give up on Florida after their experience with Hurricane Ian in late September.

"My wife gave birth to our first baby the day before Ian made landfall, so we were shuttered into the Cape Coral Hospital for a few days," says Vetere, a real estate agent with Coldwell Banker Realty in Fort Myers. "You could hear the wind roaring around the hospital and it sounded like the storm was inside the walls."

Vetere's house, which was built in 2020, withstood the storm, which caused an estimated \$47 billion in damages, according to CoreLogic. But Vetere believes that Florida real estate will survive the aftermath of Ian and come back stronger.

"When Hurricane Irma hit in September 2017, the real estate market had been thriving," Vetere says. "After that storm it flatlined for about 30 to 45 days because of the shock of the storm, then came back strong. The market came back strong after Hurricane Michael hit the Panhandle in 2018, too. I think a lot of people find the resiliency of Florida appealing."

For Vetere, rebuilding is personal.

"I proposed to my wife on Fort Myers Beach," Vetere says. "What happened there was a tragedy, but I believe they will build it back better."

The rising number of storms and their increased intensity due to climate change, and the high death toll and devastation from Ian have some people worried that the Florida real estate market could be dead. After all, the storm was terrifying for those who lived through it, insurance companies are fleeing the state, and rebuilding is an expensive proposition. But the counter argument is this: homes built in recent years demonstrate that resilience to storms is possible. Florida continues to appeal to people who want to escape the cold weather and high taxes that come with living in the Northeast.

MIXED RESPONSES TO HURRICANE THREATS

The damage from Hurricane Ian, as with most hurricanes, was uneven, says Phillip Ford, executive vice president of the Lee Building Industry Association in Fort Myers. Individual reactions to the storm are likely to be uneven, too, with some people leaving for good, some moving inland and others rebuilding along the coast.

"The island communities of Sanibel, Captiva and Fort Myers Beach were devastated and there was some significant inland flooding, too," Ford says. "But what we're seeing is the building codes in Florida are holding up and doing what was intended."

Ford points out that when Hurricane Michael hit the Florida Panhandle, it was mostly older homes that were destroyed because they weren't engineered to stand **up to storms.**



"I'm sure some people will leave Florida, and some people will move inland, especially if they lost their house now," Ford says. "But we're not likely to see long-term Floridians leave. People who live on Fort Myers Beach won't go anywhere because it's a tight community that they want to rebuild."

Jennifer Languell, president and founder of Trifecta Construction Solutions in Fort Myers anticipates a bell curve with most people choosing to rebuild.

"We'll certainly see some people leave Florida but an equal number or more will move here to retire or for jobs or to take advantage of the low taxes here," Languell says. "The people I know on Sanibel all plan to rebuild there. It's a tight-knit community."

Ford says newer homes in Florida, which are also more resilient to storms, are already primarily built inland along the I-75 corridor. These newer communities have power lines underground, which meant the power came back on more quickly after Hurricane Ian.

"To fix an older home, it can cost as much as 50 percent of the cost of the house to bring it up to code," Ford says. "Some people may need to knock them down and build them higher above ground on stilts or on a higher elevation."

Of course, the ability to rebuild depends on homeowners' insurance coverage. **RMS, a Moody's Analytics company**, estimates that privately insured losses will total between \$53 billion and \$74 billion for wind, storm surge and flood damage from Hurricane Ian. Another \$10 billion in flood-related losses is estimated by RMS to be covered by the National Flood Insurance Program.

Natural disasters have become more common everywhere with climate change, Vetere says.

"You almost have to pick your poison now," Vetere says. "There's almost nowhere you can live that's without disaster risk."

HOMES THAT STOOD UP TO IAN

After Hurricane Charley slammed into Florida in 2004, building codes—which had been upgraded after the devastation of Hurricane Andrew in 1992—were tightened again, Vetere says.

"Every new house has to have impact glass to withstand high winds or hurricane shutters," he says. "Roofs need to be nailed or tied down. And some whole communities have been lifted with stilts or more ground as risk management, which is especially important with sea levels rising."

Vetere's house is adjacent to a drainage canal.

"The county inspectors made our builder redo the culvert three times before it passed inspection, but it worked because two days after Ian our lot was bone dry," says Vetere.

Hurricane protections such as impact glass or shutters are a selling point in Florida, in part because homeowner's insurance is less **expensive if you have** those protections in place, Vetere says.

"You can hire someone to do a wind mitigation inspection, which is especially important for homes built before 2004, to see if they have been upgraded with new windows or shutters and extra nails in the roof," Vetere says. "A lot of sellers advertise that they have a new roof because it's so important for the insurance coverage."

Newly built homes in Florida, particularly if they are inland, stood up remarkably well even to the extraordinary force of Hurricane Ian. One example: Babcock Ranch, about 30 miles inland just north of Fort Myers Beach, where the 5,000 residents escaped the storm nearly unscathed.

"Babcock Ranch took years to plan, looking at how to use the land in the best way while not fighting nature," says Languell, who worked on the plans and is a Babcock Ranch resident. "The community was designed around the natural flow of water and achieved a green home certification because of the disaster mitigation steps we took, the durability of the homes that allows people to shelter in place, as well as water and energy conservation measures."

Hurricane Ian was a big test for the community, which opened in 2018 and has a solar array that can power 30,000 homes even though there are only about 5,000 residents there so far.

"We never lost electricity or even our internet connection," Languell says. "Our homes didn't flood because they are built 30 feet above sea level and the roads are 27.9 feet above sea level, so the road would flood first. If the lakes get to capacity, then the water goes to the street, and we have two more feet before it gets to the lowest level of each house."

The combination of utilities being placed underground, storm water management with redundancies built in, the elevation of the homes and upgraded building codes so that the windows, shingles and roof resisted the wind contributed to the communi-

ty's resilience, Languell says. Even better, the homes, which start at \$250,000, are comparable in price to nearby communities.

"Homes today, even if they are close to the coast, can be engineered to withstand high wind and elevated so the storm surge is more manageable," Ford says. "It doesn't cost much to fasten the roof with some extra nails and adhesives. You can build homes with concrete or stucco in hurricane-prone areas, especially on the



Weather resistant. Some homes went through Hurricane Ian without any problems outside of a heavy storm. Otherwise, life goes on as usual. COURTESY OF SOUTH FLORIDA WATER MANAGEMENT DISTRICT

lower floor where they might get flooded to reduce exposure to mold."

Ford believes innovative engineering and simple steps that increase the resilience of homes to storms will contribute to the enduring allure of Florida. **GB**

TRANSCEND

HOME  EVOLVED

All-purpose product. A Transcend Home is quick and easy to build—construction starts in a factory, and total completion takes about six months—and its resilience makes it possible to install on property almost anywhere.

INSIDE JOB

Super-efficient, sustainable prefab homes can now be designed, built and delivered by Dvele in six months.

BY MICHELE LERNER

Prefabricated homes have been around for decades—more than a century if you want to include Sears Kit Houses from the early 1900s. But for all the interest in prefab and modular housing as a solution to sustainable residential development, it's been a challenge to match the technology with delivery systems that can achieve the goal of building thousands of homes each year rather than a few hundred.

Green Builder Media partnered with California-based prefab builder Dvele to develop Transcend Communities, which feature net zero, all-electric homes with solar power and battery storage. Transcend Homes are designed to be self-powered, healthy, resilient and connected with the DveleIQ smart home system.

"Step one for energy efficiency and human health is the optimized building envelope we've introduced with Transcend," says Brandon Weiss, co-founder and chief innovation officer of Dvele. "The building science that goes into the prefabricated modules have been engineered to be 12 times more efficient in reducing air leakage. The materials and design also make the homes 10

times healthier than other homes because of the reduction of contaminants, along with better water and air quality."

COMMUNITY OF THE FUTURE

Transcend Homes can be manufactured, delivered and installed within six months. The prefab process reduces waste, provides quality control and is cost-effective, Weiss says. Green Builder Media and Dvele plan to build net zero carbon Transcend Communities that use renewable energy systems and demand-side energy management technology to serve as their own microgrids.

"Buyers can choose modules online to configure the layout of their home," says Weiss. "The goal is for the variety of configurations to add visual interest in a community."

Transcend Homes are designed to be net positive and generate a minimum of 20 percent to 30 percent more energy than they need.

"We want to add even more solar power and more battery storage on future homes," says Weiss. "The excess energy is available to charge a car and to provide power during outages, especially if the solar array is covered by snow."

The first demonstration **Transcend Home** will be in the

San Juan mountains of Colorado. But, Transcend Communities can be built anywhere, since the homes are adaptable and resilient to any climate.

"We want to be an asset to the grid with excess power from the homes," says Weiss. "We can decrease demand at peak times with onsite shared energy storage and stabilize the frequency of peak loads. A shared microgrid means that people can get similar benefits from the solar power even in homes that face north or are under a tree canopy."

Weiss hopes that water conservation and collection can be optimized to develop net positive water communities, too.

"Electricity use for wastewater treatment is a big cost for cities," says Weiss. "It would be better to decentralize wastewater management. Also, there are systems that can filter rainwater to be drinkable through a community well system. There are regulatory issues around that, but we hope to pursue that option as Transcend Communities grow."

Transcend Communities are designed for a healthy lifestyle with walking trails, community gardens, wellness centers, coworking spaces, EV charging stations and shared transportation options.

ADAPTABLE HOMES FOR DIFFERENT LIFESTYLES

The modular Transcend Homes offer buyers numerous choices for their initial configuration and opportunities for future transformations.

"Buyers can add modules over time to the side or the back of the home," says Weiss. "Since the modules are built in our factory and aren't stick-built, they will seamlessly work with existing modules. The homeowners can add a crawl space or a foundation to expand their home's footprint."

The modules can be tied into the systems in the house, or they can be self-sufficient accessory dwelling units (ADUs) that are attached or detached, Weiss says.

"The modules are extremely resilient to climate impacts and storms," says Weiss. "They're resilient to wildfires. And, it wouldn't take much extra for us to achieve a higher level of hurricane resilience when we build communities in hurricane-prone areas."

The homes are constructed with light gauge steel and cladding, and sheathing materials that increase their ability to withstand extreme weather conditions.

HIGH PERFORMANCE, SELF-POWERED HOUSING

Transcend Homes are considered self-powered because they use very little energy, are all-electric and can be operated off grid.

"We start with a conservation-first approach with the airtight building envelope and ultra-efficient systems to decrease demand. Then, we layer in the solar power and battery storage," says Weiss. "Every Transcend Home will have a 26-kilowatt battery storage system."

The Transcend Homes will use heat pump air and water heating and cooling technology, high performance lighting systems, and induction cooktops to reduce demand for energy.

Water conservation efforts are also important to the home's comfort and performance. "We have low-flow fixtures and water sensors to **reduce water loss due to leaks**," says Weiss. "We also



Smart investment.

The DveleIQ system keeps homeowners apprised of air quality, energy efficiency and home security matters.

HOME SECURITY CENTRAL

A Transcend Home's ERV system is connected to the DveleIQ smart home system, which monitors all features in the house for air quality and more. "DveleIQ allows homeowners to take the thinking out of managing their indoor air quality and energy-efficient features," says Weiss. "For instance, if the homeowners have guests, the DveleIQ system can detect the need to change the airflow's cubic feet per minute (CFM) to increase fresh air [circulation]." Water filters are also used throughout the house for better water quality. "The DveleIQ platform provides a responsive intelligent house by using a data-rich process to optimize the home features and educate the occupants," says Weiss. "For example, homeowners can look at the sensors to see what's happening in their home. Maybe the sensor picked up more particulate matter. The sensor then signals it's time to clean the house. The DveleIQ platform can also provide energy tips, such as reminding homeowners not to wash or dry their clothes during peak usage times."

Homeowners can add motion sensors, alarm systems, smart locks and geofencing to the DveleIQ system to increase household security.

"DveleIQ integrates all the mechanical systems in the house, including the water heater, the HVAC, air quality sensors, leak detectors and water management system, lights and speakers," says Weiss.

The goal is to provide comfort and simplicity for occupants in the Transcend Homes. The circadian lighting systems in the homes, which mimic the changing light from day to evening and in different seasons, are meant to enhance sleep, moods, productivity and cognitive function. Better indoor air quality also provides sleep benefits, as do the quiet appliances and systems sound attenuation materials used to keep noise levels low.

The **VISION** House Transcend will feature:

- ✿ Ground-source heat pump air and water heating technologies with radiant heating and cooling by Uponor
- ✿ Energy and water saving electric appliances by Samsung and Dacor, including an induction cooktop and heat pump dryer
- ✿ Water conserving plumbing fixtures by LIXIL-owned companies GROHE and American Standard
- ✿ Super-efficient windows and exterior doors by Arq-Espacio
- ✿ High performance insulation by ROCKWOOL
- ✿ Whole-home indoor air quality system by Broan-NuTone
- ✿ Solar photovoltaics, inverters, and batteries by JinkoSolar
- ✿ Smart electrical system and EV charging station by Schneider Electric
- ✿ Air and water barriers by PROSOCO
- ✿ Sustainably manufactured antimicrobial and slip-resistant tile by Daltile
- ✿ Beautiful and sustainable quartz countertops by Caesarstone
- ✿ Innovative speakers and sound solutions by Sonos
- ✿ Sustainably harvested engineered wood floors by CRAFT
- ✿ High-design, sustainably manufactured doors by TruStile
- ✿ Elegant natural furniture by Lee Industries
- ✿ High-style cabinets by Norelco
- ✿ Temperature and humidity mitigating drywall by USG



optimize water distribution in the house—if you can get hot water quickly, there's less waste. We want people to be able to get in the shower and then turn it on to economize their water usage rather than turn on the water and let it run to warm up.”

Depending on local regulations, Transcend Communities will include rain capture and greywater systems for gardens and other uses, Weiss notes.

✿ **HEALTHY HOME FEATURES**

Building the modules for Transcend Homes in a factory contributes to the health of the homes, since there's no exposure to mold-inducing moisture during the construction phase. In addition, the HVAC and duct systems are sealed while the house is in the factory, to reduce exposure to dust and particulate matter. The homes are built with healthy nontoxic materials and products to eliminate VOCs, formaldehyde, particulate matter and mold.

The airtight Transcend Home is ideal for energy efficiency, Weiss notes. But for better indoor air quality, the homes must be ventilated. “Each house will have an energy recovery ventilation (ERV) system to remove air from the kitchen, bathrooms and laundry room to get rid of odors and moisture and to replace it with fresh air,” he says. “The fresh air from outside will be preheated or precooled, and then filtered and distributed throughout the living areas of the house.”

✿ **OPTIMIZED HEALTH AND WELLNESS**

“The homes have a modern design aesthetic and an emphasis on connecting people to the outdoors,” says Weiss. “We use glass doors that can be lifted or that slide away to maximize the use of outdoor living spaces and connect them to indoor spaces.”

Meanwhile, the windows are designed and located to bring in as much natural daylight as possible and to visually connect the occupants to the outdoors, Weiss adds.

The self-powered, resilient Transcend Homes “provide a new path for building healthy, sustainable homes and neighborhoods,” he says. **GB**

At one with the world.

Transcend Communities include access to wellness centers and communal products such as yoga classes. These are part of developers' emphasis on creating a socially inviting, healthy lifestyle.



Partners

Product and support for Transcend is being provided by these partners. We'll have more on their role in coming months, as the house takes shape.



HOUSING 2.0

THE WISDOM IMPERATIVE

Leadership is everything—
now, **more than ever.**

BY SAM RASHKIN

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

This article is personal. I've been consumed with maximizing efficiency and minimizing waste my entire life. Only when I became an adult did I fully appreciate the importance of this obsession and channel it towards a passion for sustainable buildings, communities, and planet. We're all a work in progress.

Back in September I wrote a related article suggesting that government is the opposite of all I strive to achieve with zero-carbon buildings. It is ultra inefficient and ultra wasteful. Yet, I pursued an extremely difficult career shift from architecture to government, managing national high-performance home programs. Not a good match for someone obsessed with efficiency and waste.

That said, I have had a dream career and the privilege to contribute to a huge impact on our built environment with these programs. We're now in a new world. I don't believe we can endlessly absorb the inefficiency and waste of government and sustain a stable society. We have to do better.

This article is an attempt to demonstrate our massive opportunity for greater governmental efficiency before us by looking at a case study on the tip of the iceberg. I had a unique opportunity, when no one was watching, to test governmental capacity for applying 10 times the innovation for effectiveness and cost savings to a program I loved. The results are compelling. But no one noticed. So, this article is an attempt to showcase what is possible. It's time.

WHAT IS LEADERSHIP, REALLY?

First and foremost, I'm not here to tear down government. Just the opposite. Our institutions, their embedded knowledge, and their missions are vital to the success, safety, and protection of democratic countries. However, history shows us over and over that when great civilizations reach a tipping point of excessive waste, inefficiency, and corruption (a.k.a., the lack of wise leadership), they fall. We can start with ancient Greece and Rome and work our way up from there.

It is very important to clarify what constitutes good leadership. One explanation is that leadership is about making informed decisions based on wisdom. As shown at the top of the next page, wisdom sits at the top of a pyramid built upon a foundation of data, raw measurements that may possibly be useful. When trends can be identified, then data becomes information that provides insight. If principles for achieving desired outcomes are revealed, then information becomes knowledge that establishes the basis for subject-area expertise. And finally, if experience is applied to knowledge, it becomes wisdom that informs effective leadership.

The Wisdom Imperative For Government Policies



THE WISDOM PYRAMID

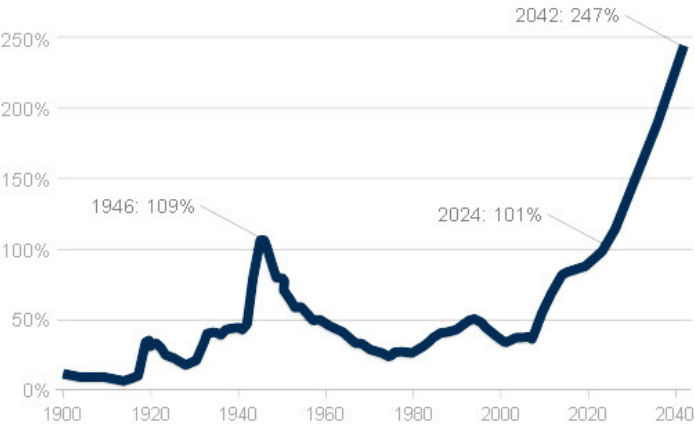
More than ever, we need and should expect wisdom in government. Everywhere we turn, problems have exploded into crises: climate, biodiversity, fresh water, forever chemical contamination, ocean acidification, infrastructure atrophy, polarization, poverty—the list goes on. It takes massive resources to address each of these problems.

That brings up one more crisis: exponentially increasing the National Debt. The figure above shows the history of U.S. debt as a percentage of Gross Domestic Product (GDP). We first blew past 100 percent right after World War II due to the incredibly high cost of engaging in world conflict. The U.S. Office of Management and Budget, in its budget for 2013, projected this would happen again in 2024 and hyper-accelerate to 247 percent in 2042.¹

But the situation is even worse than forecasted back then. When I last checked the National Debt Clock while preparing this article, it had exceeded \$31.2 trillion² and the actual fiscal gap between committed spending and expected receipts has been quantified at \$211 trillion.³ It's impossible to comprehend a number that big.

Government has to become more efficient, less wasteful and less corrupt. I'll use a personal experience to demonstrate the possibilities that arise when we do optimize efficiency and minimize waste.

U.S. Federal Debt as a Percentage of Gross Domestic Product



WISDOM APPLIED

Somehow, I stumbled my way into the dream job of a lifetime when I was recruited out of California by the Environmental Protection Agency (EPA) to direct the ENERGY STAR certified home program.

At that time, the larger Energy Star program was in its infancy, only being used to label efficient computers with an automatic sleep mode. It was a dream job because I loved housing, and Energy Star was a huge anomaly in government as an incredibly lean and mean program that operated at the speed of business and with impressive market transformational impacts. Yet, when the U.S. Department of Energy (DOE) offered me the position of chief architect for the Building Technologies Office (BTO), I left this dream job and a great collaborative team at the EPA.

Note that I had twice refused the DOE job earlier when asked to lead the Building America program in the BTO. I wasn't interested in managing a big budget research program with the enormous bureaucracy attached to it. I took the job when I was able to negotiate a position to leverage existing BTO assets and link them to the housing industry. The first priority was to take over a program called Challenge Home. This was DOE's new homes label, at a higher-tier energy efficiency threshold than ESCH. I saw leading this program as an opportunity to apply everything we learned getting the Energy Star-certified home program past 1 million labeled homes, and to do it at a substantially lower cost and better investment outcomes.

The immediate task was to fix Challenge Home by expediting implementation of logo use guidelines and partnership agreements that were, amazingly, missing from the program. The second task was to meet with builders to get "voice of the customer" feedback, to optimize their program interest. This led to a quick name change—to the Zero Energy Ready Home (ZERH) program. However, the biggest opportunity was to apply lessons-learned from leading Energy Star-certified homes to make the program ultra-efficient and ultra-lean, since I was able to start with a clean slate. The resulting cost savings achieved with ZERH compared to Energy Star are shown below and they exceeded all my expectations.

Investments and Savings for Zero Energy Ready Home

Investments	 ENERGY STAR CERTIFIED HOMES	 ZERO ENERGY READY HOME	Savings
Full-time Staff (PY)	5	.5	10X
Contract \$/Yr.	~\$2 Million	~\$.5 Million	4X
Tracking System	~\$2 Million	~\$.2 Million	10X
Awards Program/Yr.	~\$250,000	~\$10,000	25X
Partner Meetings/Yr.	~\$100,000	\$1,000	100X
HERS Rater Software	~\$500,000	\$0	∞X

Relative to ENERGY STAR Certified Home

First, with a template fully established for implementing a national voluntary labeling program, staff person-years (PY) were able to be reduced from five PY for Energy Star to 0.5 PY for ZERH, adding up to a 10 times savings. The annual contract dollars for Energy Star certified homes were about \$2 million, compared to about \$0.5 million for ZERH or about 4 times savings.

The tracking system to measure program participation cost about \$2 million to develop over several years, followed by constant ongoing modifications. ZERH did not invest in its own tracking system, aware

of the database being already developed by the Residential Energy Services Network (RESNET) called the National Registry. A small \$200,000 contract with RESNET was used to modify the National Registry schema to allow real-time access by DOE to all ZERH certified homes. This was a 10 times savings.

Moreover, this system provided superior tracking capabilities with more data about the builders, homes, and ZIP Code locations. And this data was available in real-time, where Energy Star-certified homes data was only available every quarter. The system also eliminated a significant reporting burden upon every HERS rater to submit their data. Faster, better, cheaper is good.

EVERYONE'S A WINNER

Energy Star as a program held a huge national gala awards event to recognize partners across all product categories. It was a very expensive undertaking, consuming significant staff resources, contractor support, an entire ballroom and catering at a high-cost Washington D.C. hotel, and substantial expenses for attendees to travel to the event. Energy Star management mandated that Challenge Home builder partner awards be included in this event. As a rough guess, I estimated that the tax for Energy Star's share of the event was at least \$250,000, not including the substantial staff time involved to support logistics.

ZERH's first improvement was to name its builder recognition scheme the Housing Innovation Awards (HIA) rather than the ZERH Awards. This was in recognition of the fact this name would be more valuable to our builder partners than an award named for the program—ZERH is limited in appeal when compared with the pure concept of being a leader in innovation.

Without the mandate to recognize builders at a DC political event, we found much better and cheaper recognition by piggy-backing the HIA to the Energy and Environmental Building Alliance (EEBA) annual conference. EEBA loved this partnership because the ZERH Awards would bring approximately 25 of the nation's

best high-performance builders to its event, more than doubling normal builder participation. This was directly aligned with EEBA's goal of substantially increasing builder participation. As a result, I estimated a small HIA expense of \$10,000, mostly for the award plaques and glass crystals, which is 25 times the cost savings as compared to ESCH.

HIA was a better customer experience—ZERH builders received their recognition in front of a full EEBA plenary housing industry audience much more connected to their achievements than the unrelated product companies making up 90-plus percent of the Energy Star awards dinner audience. Moreover, this event gave ZERH an invaluable opportunity to educate the EEBA audience about the impressive achievements of the ZERH builders and program.

The other significant improvement with the HIA was to make ZERH homeowner testimonials about their superior use experience, and images documenting ZERHs as a requirement of the application. This content was leveraged to create the "Tour of Zero," which showcases hundreds of beautiful and cost-effective certified homes across the country, along with compelling homeowner testimonials.

Additionally, ZERH has accumulated a library of hundreds of testimonials that are available to all partners to promote their certified homes. This type of unique showcase and testimonial database is not part of ESCH, and can be continuously assembled for free by integrating prompts into the HIA application.

ESCH held a partner meeting every year, primarily with utility programs providing incentives for certified homes. Although a host utility would often pick up significant costs, I would estimate about \$100,000 of expenses for ESCH. While it is helpful for utility program staff to gather, a critical lesson-learned was that they were too tied into their own bureaucracies and glacial pace of change to apply best practices shared at these events.

As a result, ZERH set up partner meetings with its most critical customers, builder and HERS rater partners, to gather feedback on how to continuously improve the program. This only cost the



Proper management. The Zero Energy Ready Home Housing Innovation Awards showcases efforts made by builders to develop environmentally friendly homes.

program about \$1,000—to pay for lunches—it leveraged the HIA winners attending EEBA and HERS raters attending the RESNET annual conference. Thus, there was no cost for the meeting rooms and for the attendees who were already attending these events. This resulted in a 100 times cost savings for much better partner meetings that have continuously informed and improved ZERH and earned significant partner buy-in.

I recall from discussions with ESCH staff that about \$500,000 have been invested in developing HERS rater software for them to more effectively and efficiently run their businesses. ZERH would never make that investment because it is not core to its mission and objectives. That represents infinite cost savings.

IMPLEMENTING TWO LABEL PROGRAMS

I know this is a lot of detail about the implementation of two national labeling programs. However, I think it is critically important to share. That's because no one knows the story, and I was uniquely in a position to know the outcomes achieved in applying comprehensive strategies for eliminating waste across two similar government programs. I went on to apply a similar process with several other DOE project, with similar results, but I don't believe DOE management understood or valued what was achieved. The culture was predominantly focused on the larger spending initiatives.

What is important to understand about this application of lean and mean principles to extract waste is that it couldn't have applied to ESCH once it was fully operational.

Wisdom is sorely missing and constrained by government rules, policies, and procedures. What was achieved by ZERH is just the very tip of the cost savings and waste minimization iceberg. I'm confident that the 10 times benefits seen with ZERH could be achieved at a vastly larger scale across all government programs. As the federal debt races to 250 percent of GDP, the question is whether we're willing to choose the leadership that can make it happen. **GB**



Showcase homes. The Department of Energy's "Tour of Zero" highlights hundreds of beautiful and cost-effective certified homes across the entire country, along with compelling homeowner testimonials. CREDIT: COURTESY OF UNITED WAY OF LONG ISLAND

¹ U.S. Office of Management and Budget, "Budget of the United States Government," Fiscal Year 2013

² National Debt Clock, October 25, 2022

³ "Opening Remarks, It Gets Worse," Peter Coy, Bloomberg Business Week, August 1-7, 2011

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

The Housing 2.0 program is sponsored by Mitsubishi Electric, Panasonic Healthy Indoor Living Solutions, Schneider Electric, and Westlake Royal Building Products.

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THE PROGRAM IS GENEROUSLY BROUGHT TO YOU BY THE FOLLOWING PARTNERS:

The Housing 2.0 program is a comprehensive training and education program designed to teach building professionals how to prepare themselves for the massive transformation that the housing sector is experiencing. The program is helping building professionals design and construct higher-performance, healthier, more-sustainable homes, optimizing the total housing user experience with an estimated 30 to 70 percent hard cost savings/added value.

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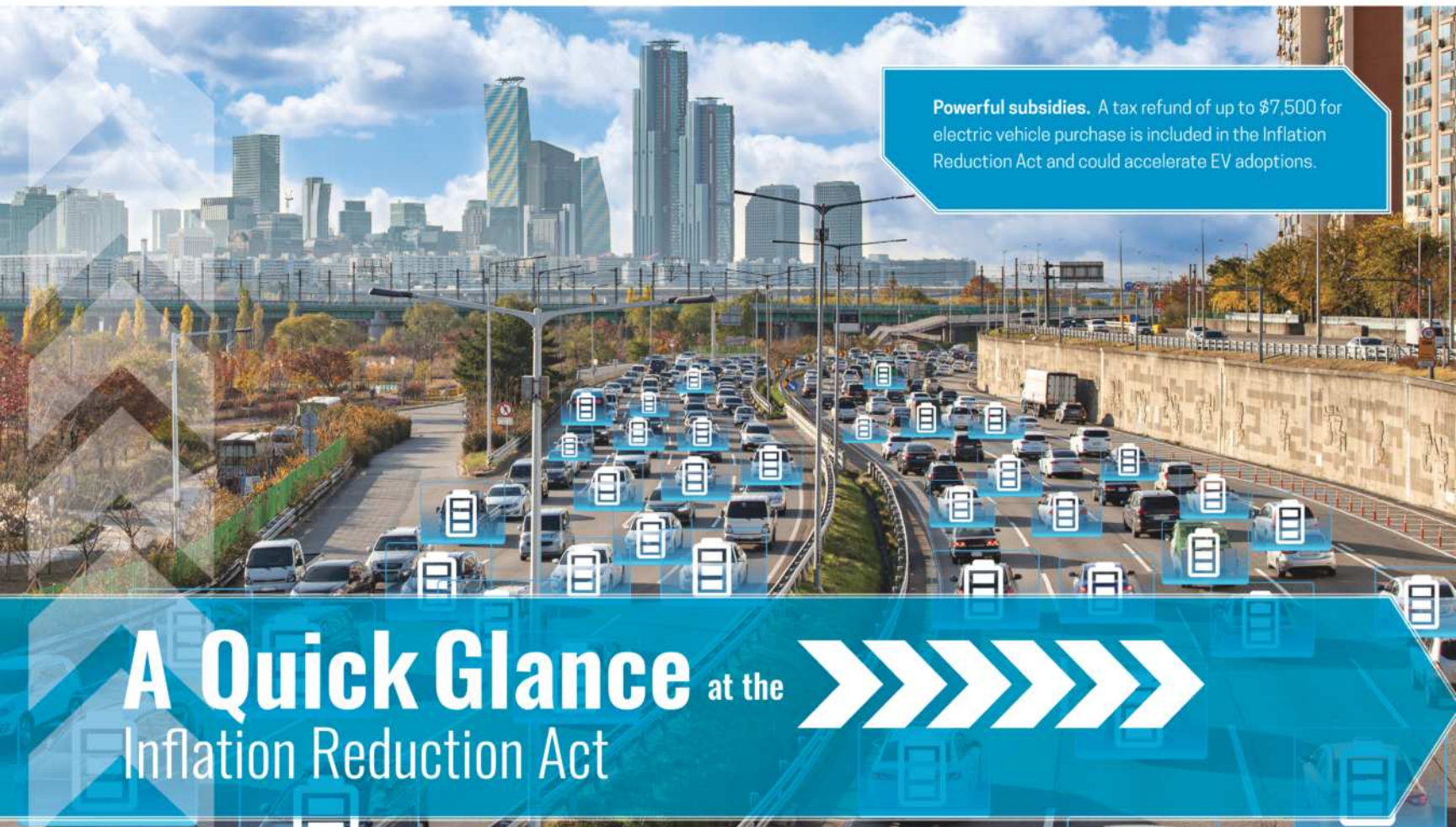
SCHNEIDER ELECTRIC is driving the digital transformation of modern homes with smart and sustainable energy solutions for ultimate comfort and energy efficiency. Its connected home ecosystem of smart energy management solutions provides digital control of energy use throughout a home, from the grid via the company's smart electrical panel to its connected wiring devices. This grid-to-plug solution makes it significantly easier to create smart, solar power and backup power-ready homes now and in the future. se.com/us/en/home

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Powerful subsidies. A tax refund of up to \$7,500 for electric vehicle purchase is included in the Inflation Reduction Act and could accelerate EV adoptions.

A Quick Glance at the Inflation Reduction Act

BY MIKE COLLIGNON

There's a lot to examine within the [Inflation Reduction Act](#) (IRA), and it would take more space than I have here. (For a state-by-state snapshot of its benefits, you can [search for your state here](#).) But rest assured that it has serious implications for the sustainability industry. Let's look at some of the highlights, as well as its possible flaws.

ELECTRIC VEHICLES (EVs)

There are some hefty incentives for EV purchasers. The IRA creates tax credits of up to \$7,500 for new, and \$4,000 for used, electric vehicle purchases. This comes at a time when the production of EVs is starting to ramp up at nearly all car manufacturers. Of course, they have good reason to, after the European Parliament voted [to ban combustion engine car and van sales starting in 2035](#). While that vote came recently, it had been in the works for some time. And you might be wondering, how much of the global car market does the European Union (EU) represent?

According to [theglobaleconomy.com](#), in 2021 the combined new car sales in Germany (2.6 million) and France (1.65 million) exceeded the United States (3.35 million). Once you add in Italy (1.45 million) and Spain (859,000), the total almost doubles U.S. car sales. Point being, the EU's decision is going to influence car manufacturers. The IRA will help Americans take advantage of the increased production.

It's not a tax credit for luxury vehicles, though. The law only applies to vehicles with a manufacturer suggested retail price (MSRP) below \$55,000 for cars and below \$80,000 for trucks and SUVs.

There could be a drawback to the EV tax credit, however. According to Brian Deese, director of the National Economic Council, the tax credit is "eligible for batteries and vehicles that are produced in the United States or in North America, or countries that we have free trade agreements with." Furthermore, final assembly needs to occur in North America. This makes sense, because one would think the U.S. government would want to encourage domestic production with use of its funds. The larger incentive is secure supply chains. (By now, I would hope we've learned the importance of those.) However, with a lot of current battery technology being manufactured in countries that don't fit the prior description, there might not be much immediate price relief for car buyers.

ENERGY EFFICIENCY RETROFITS

This is why organizations like the Building Performance Association (BPA) are ecstatic. There is almost \$9 billion in this financial package for rebate programs, and it will be facilitated through the state energy offices. \$4.3 billion will go to the HOMES Rebate program, which provides consumers rebates for comprehensive home energy retrofits.

Meanwhile, \$4.5 billion will go to the High-Efficiency Electric Home Rebate Program, which is [meant to incentivize](#) the efficient

electrification of low- and moderate-income households, including single family and multifamily properties.

There is also \$200 million in State-Based Home Energy Efficiency Contractor Training Grants (an average of \$4 million per state) to help train and educate home performance contractors with the installation of home energy efficiency and electrification improvements. We've talked in the past about the need for more (and younger) tradespeople. With the inclusion of training funds and the enormous amounts of rebates, now is as good a time as any for young people to enter, or someone looking to switch to, a career in the home retrofit industry.

One word of caution: In section 50121 of the bill, it specifically (and justifiably) disallows using each of the rebate programs for the same upgrade: "A rebate provided by a State energy office under a HOMES rebate program may not be combined with any other Federal grant or rebate, including a rebate provided under a high-efficiency electric home rebate program (as defined in section 50122(d)), for the same single upgrade."

INCENTIVES FOR ENERGY EFFICIENT CODES

The last time we saw financial incentives for energy code adoption was the American Recovery and Reinvestment Act (ARRA) funding over a decade ago. It was pretty effective in getting states to update, or even adopt, a building code. (Yeah, I'm looking at you, Alabama.) While not using quite the same approach, the IRA is making \$330 million available to help states and local governments "adopt a building energy code (or codes) for residential buildings that meets or exceeds the 2021 International Energy Conservation Code (IECC), or achieves equivalent or greater energy savings; a building energy code (or codes) for commercial buildings that meet or exceeds the ANSI/ASHRAE/IES Standard 90.1-2019, or achieves equivalent or greater energy savings, or any combination thereof"¹

The incentive increases to \$670 million for states and local governments that choose "to adopt a building energy code (or codes) for residential and commercial buildings that meet or exceed the zero energy provisions in the 2021 International Energy Conservation Code or an equivalent stretch code." The funding is available for the next 7 years.

No matter the chosen path, the legislation calls for the adopting jurisdiction "to implement a plan...to achieve full compliance with any building energy code adopted... in new and renovated residential or commercial buildings, as applicable, which plan shall include active training and enforcement programs and measurement of the rate of compliance each year."²

¹ "Why there's a 'high bar' for new EV tax credits, according to a Biden economic adviser," by Akiko Fujita, Yahoo! Finance, August 18, 2022.

² <https://finance.yahoo.com/news/why-there-a-high-bar-for-new-ev-tax-credits-according-to-a-biden-economic-advisor-131611401.html>

³ A very conservative one-third of the nearly 7 million annual homebuyers (based on 2021 data) opting to qualify for the mortgage interest deduction results in over 20 million zero energy ready homes by 2030, exceeding the inflection point and locking in exponential growth. H.R. 5376 -

<https://www.congress.gov/bills/117th-congress/house-bill/5376/text>

⁴ "Will the Inflation Reduction Act jumpstart carbon capture?" by Emily Pontecorvo, Grist, August 22, 2022.

<https://grist.org/technology/will-the-inflation-reduction-act-jumpstart-carbon-capture-45q/>

⁵ "Democrats Designed the Climate Law to Be a Game Changer. Here's How," by Lisa Friedman, New York Times, August 22, 2022.

<https://www.nytimes.com/2022/08/22/climate/epa-supreme-court-pollution.html>

MISCELLANEOUS

Two other quick notes about the IRA: Depending on how you feel about carbon capture and storage, the IRA also contains incentives for that technology. In fact, those incentives nearly doubled. Companies will also get a 7-year extension on the commencement of carbon capture equipment construction. The IRA also lowers the total amount of CO₂ that a project has to capture annually to qualify for the tax credits.

Finally, the environmental community was greatly disappointed by the Supreme Court's June 2022 ruling that restricted the authority of the EPA to regulate greenhouse gasses. Well, consider that rectified. The New York Times reports that the IRA: "amends the Clean Air Act, the country's bedrock air-quality legislation, to define the carbon dioxide produced by the burning of fossil fuels as an 'air pollutant.'"

That language, according to legal experts and the Democrats who worked it into the legislation, explicitly gives the E.P.A. the authority to regulate greenhouse gasses and to use its power to push the adoption of wind, solar and other renewable energy sources."



Higher learning. The Inflation Reduction Act includes \$200 million in State-Based Home Energy Efficiency Contractor Training Grants to help teach contractors about sustainable household improvements.

The environmental provisions in the IRA aren't nearly as ambitious as some of the rhetoric used by President Biden during the 2020 presidential campaign. Given the dynamics of the current Congress, that was never very realistic anyway. The end product is still the United States' largest-ever investment in climate mitigation. History will ultimately judge whether it was too little and/or too late. **GB**

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

NAVIGATING THE POST-PANDEMIC RESIDENTIAL GREEN BUILDING MARKET

PART ONE <<<

Teaching task. Not all people who initiate building projects know how to make them green—or the benefits of doing so. That becomes a builder's job.



BY TERRY BEAUBOIS

The next few years will be important ones for sustainable builders. Significant technological developments and advances are being made in numerous areas that can affect green building in positive way. At the same time, these advances can make it even more challenging for our homeowners/clients to begin their projects.

Current market studies reflect recent changes in the financial markets, and related effects on residential construction. Now more than ever, homeowners will value green builders and architects who understand how the homeowner's choices, decisions and concerns reflect their value in the design and construction of their homes. Few projects are 100 percent green or zero percent green, so the ability to help homeowners establish priorities and values for their decisions will become a competitive advantage for green builders in the next few years.

A key to establishing value with potential clients includes the ability to help them deal with their upcoming, complex set of choices and decisions. This may be their first time undertaking such a complex set of related decisions with financial ramifications. They will value your ability to help identify opportunities and priorities for their project.

HELP HOMEOWNERS, HELP OURSELVES

People and companies who initiate building projects are not always aware of all of the possible ways “to make their building green,” or of all the benefits of doing so. We have

ongoing opportunities and reasons to keep ourselves up to date and to inform our clients and potential clients about the benefits of green building.

Because each building type is almost its own mini-industry, there may be practices within one type that aren't common in another. We can learn how the new ones interact with the building owners in their building type.

ARCHITECTURAL ENGINEERING CONSULTANTS AND THE BUILDING INDUSTRY

As an architect, I've had the privilege of being involved in a wide range of building types. This gives me a fairly broad perspective of how the industry functions. I have a very familial attitude toward all members of the building industry—professionals, tradespeople and students from end-to-end of the building process and in a number of building types.

The building industry is one of the oldest, largest, most-diverse and most-important ones on Earth. We communicate across an industry that has been described as “somewhat tribal” because its separate professions and trades have their own histories and “language” of specialty communication. Apprenticeships, training and learning-specialized unique language, tools, and knowledge of the specialty are often required. Understanding and respecting the building industry is our best approach to successfully improving it.

Improvements to the efficiency and effectiveness of inter-industry communication can help each profession and

The ability to assist and guide homeowners in establishing priorities, and the value of their choices and decisions, will be a competitive advantage for green builders in the next few years.

trade succeed. This is actually a necessary component; new tools and an increase in “interoperability” will give us the opportunity to accomplish this.

WHAT ALL BUILDING TYPES HAVE IN COMMON

At the top of the agenda of all building types should be, quite simply, to make full use of the tools, technology and knowledge available to us; to create buildings that improve the sustainability of the planet and the sustainability of humans—in other words, green buildings. This perspective allows such construction to contribute at a significant level, to all building types.

The first order of business is to clearly understand how to best engage and incorporate our clients in sustainable construction at the beginning of our projects. This will contribute to our successes in green building.

Some building types have an advanced, sophisticated and formal initial phase. They have a clearly stated Request for

Proposal (RFP), which it explicitly describes the project, and identifies and define its requirements, phases and deliverables.

Many hotel/resort projects are excellent examples of a building type that has well-developed standards in the RFP phase through completion of project. This is particularly true among the major hotel development brands. Many government projects also follow strict guidelines and procedures for procuring architectural, engineering and construction services for a wide variety of building types, from offices to veterans’ hospitals and military facilities. This guidance is beneficial to the client and the AEC by clearly defining the project and its requirements.

Single-family custom homes where homeowners/clients are directly involved in initiating and participating in the planning and design are probably the least formal example of how a building-type begins and applies a clear procedure to the process. There is no “standard” RFP method. It can vary depending upon the homeowner, the site location, requirements of the local building and planning department, and other factors. Personal knowledge, experience and familiarity with local requirements are all significant.

COMBINING HOMEOWNERS’ VALUE WITH OUR BUILDING KNOWLEDGE

Guiding less-experienced clients through the process takes skill and talent. It can, in many ways, make the project easier and better for the builder when based on proven building industry experience and practice. The better this process is communicated to the homeowner/client, the better it is for project’s outcome. How we customize each customer’s sustainable project should reflect our collective experience and knowledge of what makes such a project successful. That is what is built into the Client Engagement phase of other successful building types. I’ll further explore this topic in part 2 of this article in a future *Green Builder*. **GB**

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

Recipe for success. An architect’s success in green building starts with helping customers understand the benefits of sustainable construction.





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greenbuildermedia.com/todays-homeowner

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PAGE 3

**COMING NEXT ISSUE****Green Home of the Year 2023**

Green Builder's annual award program selects some of the year's most innovative, sustainably built homes. We'll also honor three communities that are serious about the environment, and announce our Sustainability Superhero and Pathfinders of the year.

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Time to Wake up From the American Dream



Ron Jones

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MY FAVORITE AMERICAN SATIRIST AND HUMORIST, WILL ROGERS, could find a way to look at almost any situation and respond with a wry and incisive remark. One of his best had to do with his take on the state of the economy, when he said, “An economist’s guess is liable to be as good as anybody else’s.”

So, speaking as one of the “anybody” crowd, I am always amused (and frankly, somewhat confused) upon hearing the latest opinions expressed by those housing industry experts and outside observers who regularly take their best shots at getting the forecast right in hopes it will garner them currency down the road, in one form or another.

Plenty of folks seem willing to make predictions for the future. But they stubbornly insist that any predictions be based upon the same old antiquated economic formulas that do little more than model repeated rides on an endless roller coaster of bust and boom cycles that we’ve all come to expect and think of as inevitable.

What this strategy fails to account for are the really “big picture” factors such as climate change, the future of energy, the transforming workforce, and an honest assessment of what private home ownership is going to look like going forward—and I don’t just mean in the next couple of quarters.

While I freely admit that I have nothing to lose here, I’m willing to go out on the proverbial limb and suggest that we are about to wake up from the deep sleep of the so-called “American Dream.” We’re about to discover that the ever-widening gap in home ownership between the upper strata of the market and those at the entry and first time move-up levels will necessitate a complete overhaul of the housing model we’ve all been accustomed to for the better part of a century.

As evidence of what I’m referring to, I point to the growing number of examples where school districts, health care organizations, first responder groups and many other public entities have mimicked the private sector in factoring attainable

We’re about to discover that the ever-widening gap in home ownership between the upper strata of the market and those at the entry and first time move-up levels will necessitate a complete overhaul of the housing model we’ve all been accustomed to for the better part of a century.

housing as a critical part of the equation when it comes to recruiting and retaining the workforce that they need to operate sustainably.

We are not strangers to the concept of the “company town,” as exemplified by the railroads, mining and other large industries. But now we are seeing municipalities leverage housing availability and affordability as a powerful tool to attract and hold onto the workers necessary to support their core industries like tourism, agriculture and manufacturing.

Consider the example of military housing, which, while supporting the look and feel of market single-family and attached dwelling units, historically existed to help compensate personnel for incomes that could not match the civilian sector. The not-so-obvious benefit to this strategy came with the boost in retention that reliable, affordable housing offered those in uniform and their families.

Equally important is realizing that all of this is reflected in expanding public policy, at various levels, that is designed to encourage sustainable housing and support community efforts that are increasingly driven by a multitude of social dynamics rather than simple market solutions. There is a lot more than supply and demand at work in this trending phenomenon and I think we can expect that its impact will only continue to increase.

The world is definitely undergoing unprecedented changes and the shelter industry will need to adapt with the times. **GB**



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