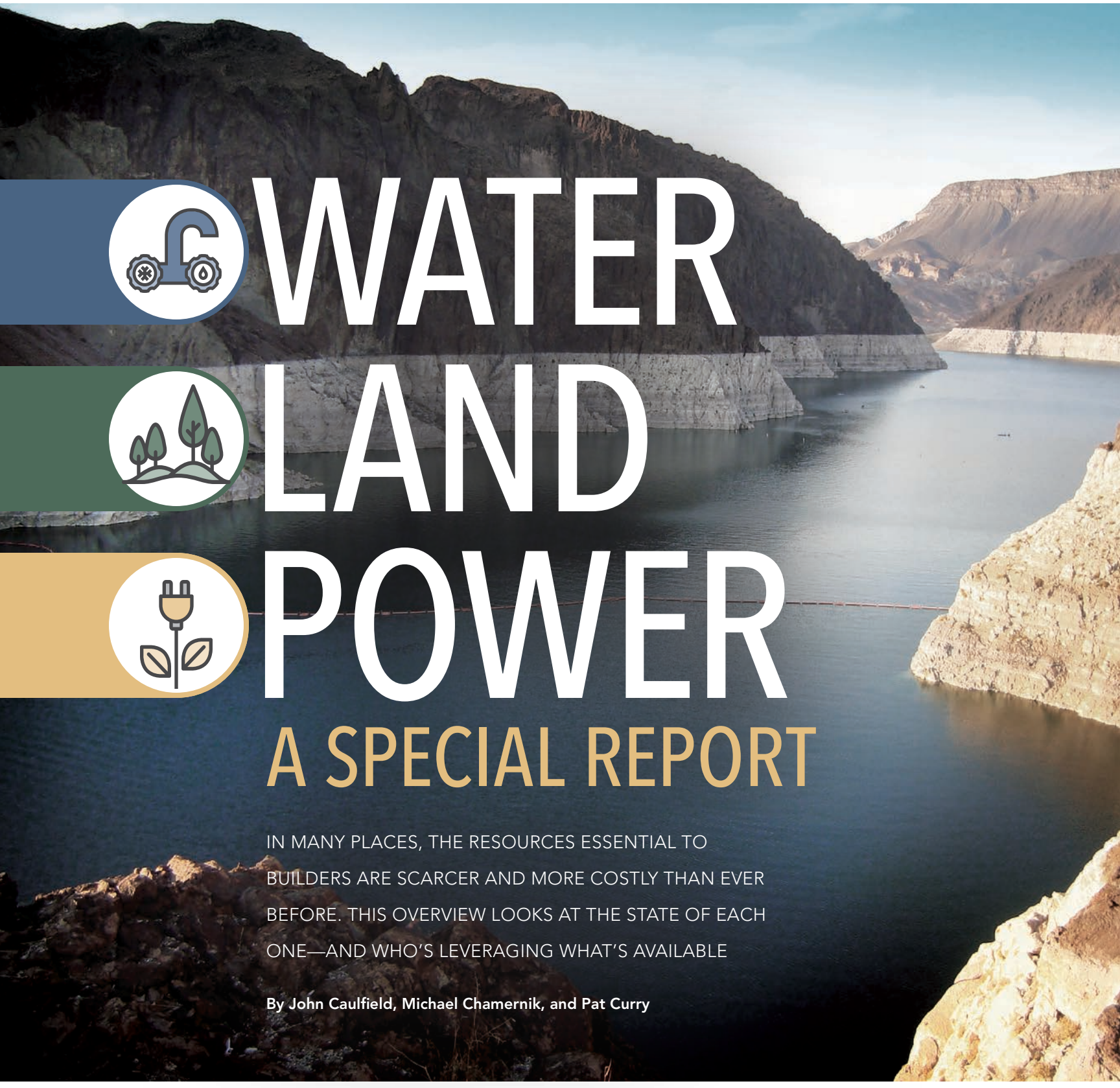

WATER LAND POWER

A SPECIAL REPORT

IN MANY PLACES, THE RESOURCES ESSENTIAL TO BUILDERS ARE SCARCER AND MORE COSTLY THAN EVER BEFORE. THIS OVERVIEW LOOKS AT THE STATE OF EACH ONE—AND WHO'S LEVERAGING WHAT'S AVAILABLE

By John Caulfield, Michael Chamernik, and Pat Curry

Lake Mead water levels are at historic lows.

FLUID MEASURE

WATER IS THE EARTH'S ONLY IRREPLACEABLE RESOURCE, AND IT'S IN SHORT SUPPLY. THERE ARE FEW CONSTRUCTION RESTRICTIONS CURRENTLY, BUT TIGHTER USAGE REGS COULD BE IN THE OFFING

By John Caulfield, Senior Editor

This past summer, Massachusetts endured its worst drought in more than a decade, with 168 towns facing restrictions on nonessential outdoor water use. The city of Worcester, whose reservoir system was at 55 percent capacity, imposed emergency restrictions that banned all outdoor water use and required builders to file variances to use water for jobsite dust control or to draw water from existing fire hydrants. But home building soldiered on. In metro Boston, water-use restrictions haven't impeded Cutting Edge Homes, a design/build firm that builds between 15 and 18 homes per year. "Over the past six months, we've been concentrating on how to handle a resurgence in business," owner Sean Cutting says. He hopes the drought is an anomaly.

This summer, most of Utah's 48 reservoirs were extremely low, with a dozen empty or close to it. But Ivory Homes, the state's biggest builder, hasn't encountered any water-shortage-related constraints, says construction manager James Jonsson. But he concedes that he may be singing a different tune if the state has another below-average year of snowmelt.

And in northwestern New York, which has seen uncommonly dry weather, building has proceeded apace at Forbes Capretto Homes, based near Buffalo, which builds about 60 houses a year. "We're in the Great Lakes Basin, so we have lots of water," says William Tuyn, VP of development and diversity. But he's quick to note that statewide regulations now require developers and builders to control the volume of jobsite rainwater runoff to preconstruction levels. And because of the area's high clay content and low permeability, his company often needs to truck in special soil and build an underground water catchment system.

Drought conditions are no longer confined to California, Nevada, and Arizona. Yet around the country, builders say they aren't being boxed in by water shortages. With few exceptions—such as East Palo Alto, Calif., which this year imposed a moratorium on new development because it didn't have enough water and put 11 projects on hold—parched municipalities aren't stopping residential construction from occurring.

"There is a huge political will not to stop development," says Susan Dell'Osso, project manager with The Cambay Group, whose 4,800-acre River Islands community in Lathrop, Calif., will include 11,000 homes when it's completed. But development requires patience: New communities in California with more than 500 homes must demonstrate water availability "in perpetuity." It took Cambay 14 years to obtain a water source for River Islands, which included kicking in half of the $40 million that the city of Lathrop paid to share a 40-mile pipeline to gain access to the water it needed.

In August, California lifted the water-use restrictions it imposed in the summer of 2015 for most of its larger water districts. And several other western states are recovering from drought conditions this year. But builders shouldn't get lulled into a false sense of security: Most experts see more dry weather and scarcity ahead. A 2014 General Accountability Office survey found that 40 of 50 state water managers expect their states to have water shortages in the next decade. "Thirty years ago, California had more water than it knew what to do with," recalls Robert Raymer, technical director for the California Building Industry Association (CBIA), in Sacramento. "Any builder who thinks they have an unlimited resource needs to ask themselves: What if things change?"

SAVING WATER SAVES ENERGY

That question isn't likely to get asked, though, as long as water remains dirt cheap, which is still the case in many areas of the country. Dell'Osso says that water in her market is billed at around $3 per 1,000 gallons. In the absence of incentives to voluntarily conserve, the U.S. housing market has produced modest water-saving gains. The Water Research Foundation, in a study released in April that evaluated 23,749 homes served by 23 utilities nationwide, found that annual indoor household water use had been reduced by 22 percent, to 138 gallons per day, from levels in a similar study conducted in 1999.

Later this year, the Residential Energy Services Network (RESNET) plans to publish a Water Efficiency Rating (WER) Index Standard that Steve Baden, its executive director, says will be a companion to RESNET's HERS rating for energy efficiency. The goal is to measure the water efficiency of 100,000 homes per year, and RESNET's standard will become an ANSI standard through an agreement with the International Code Council. "This will give homebuyers another metric to use when assessing their purchase, and builders a way to monetize water saving," Baden says. The rating may also provide builders with ammunition when presenting development or construction plans to municipalities that are taking long-range water allocation into greater account.

Reducing water use can have a positive effect on energy consumption, too. The University of California, Davis Center for Water-Energy Efficiency calculates that 20 percent of California's electricity and more than 30 percent of its natural gas go toward water delivery. And the first three months of California's statewide water conservation period saved more energy (460 GWh) than the total first-year savings from the state's energy-efficiency programs (459.4 GWh).

While drought conditions have yet to curtail new-home construction, they do affect what's getting built. Bill Christiansen, program manager for the Alliance for Water Efficiency, says his group is already seeing jurisdictions changing their water policies to require that new developments offset their projected water demand with water efficiency measures to create a "Net Zero" or neutral result. In Colorado Springs, Colo., Level 1 Homes, which builds about 12 homes per year, typically digs wells for water access. To get permitted to tap into the Dawson aquifer in the Denver Basin system, wells are equipped with consumption monitors whose data are annually sent to the state. Clint Dufresne, Level 1's president, says this requirement has led his company to landscape its homes' 2-acre properties with much smaller lawns and more xeriscaping and drip irrigation.

Level 1 is among 130 builders that participate in the Environmental Protection Agency's WaterSense program, which is celebrating its 10th anniversary this year. Through 2015, more than 16,000 models of products have been WaterSense labeled. Through the second quarter of 2016, 797 labeled homes were reporting their water- and energy-saving performances to the EPA. Several states and code organizations specify the use of WaterSense-labeled products, and the EPA wants to develop a water score that complements Energy Star's energy score. Where WaterSense falls short, though, is in its brand awareness. Less than one-quarter of Americans know what it is. A 2015 study commissioned by Plumbing Manufacturers International found that just 7 percent of all toilets installed nationwide meet WaterSense standards, compared with 25.4 percent of faucets and 28.7 percent of showerheads.

Jacob Atalla, VP of sustainability for KB Home—WaterSense's highest-profile member—hasn't seen evidence that customers come to KB specifically because of its involvement in this program. But participating in WaterSense is part of the production builder's larger strategy to promote its homes as more efficient and to be able to prove that to municipalities in the event that water-use regs get tougher. "You have to respond to current and future realities," Atalla says. On its jobsites, KB uses reclaimed or recycled water for dust mitigation. Its model homes are landscaped with drought-tolerant plants. It went beyond WaterSense by specifying a restrictive-flow water faucet and then exploring its impact on consumer usage. Atalla adds that KB is trying to do more with drip irrigation and allowing homeowners to control this via their mobile devices. And the builder specifies a low-flow lav sink faucet as standard in its homes across the country.

INFRASTRUCTURE REPAIR: A COSTLY DILEMMA

Tennessee is also going through some unexpected dry spells. But when Nashville-based builder Ole South Properties runs into snags over a property it wants to buy, it often has less to do with water availability than with permitting issues that, according to Dan Bobo and Roger Case, the builder's development manager and

MAKING WATER REUSE FEASIBLE

In most markets, gray-water reuse is still a bridge too icky for consumers to cross. But that could change as codes evolve: Four international plumbing and building codes now require that water-reuse systems used for toilet and urinal flushing comply with NSF/ANSI 350 to ensure proper treatment of gray water. The Cambay Group has been encouraging its builders at River Islands to install the Nexus gray-water system for outdoor irrigation. Susan Dell'Osso, project director for master planned communities at Cambay, claims that the system reduces water usage for a family of three by 200 gallons per day. But the builders are balking at what it would add to the home's selling price, so Cambay, through its local Reclamation District, is trying to secure a low-interest loan so it could rent the gray-water systems to homeowners for around $25 to $30 per month.

Home Creations, in Norman, Okla., is considering gray-water reuse for its largest project to date, Destin Landing, a 762-acre Planned Unit Development in Norman, where Home Creations will build 2,700 of some 3,500 homes.

California is in the process of implementing a "purple pipe" recycling mandate for the 15 percent of its 500-plus jurisdictions that have access to a centralized water recycling plant. (The regulations go into effect in July 2018.) The California Building Industry Association's technical director, Robert Raymer, adds that the state is considering a mandate for in-home gray-water reuse, although health concerns still need to be addressed. As shortages attract attention, and as water and sewer rates have been rising at a 12 percent annual clip nationally, according to RESNET, solutions are arriving that offer homeowners ways to clean and conserve water.

- HydroTech Solutions offers a water-treatment system that prevents scale from forming inside pipes. Pete Baldwin, the Fort Worth, Texas-based supplier's founding partner, explains that his product is especially useful in markets where people are turning to groundwater and well water "that can be pretty hard." The system can also help kill bacteria and pathogens from recaptured rainwater. HydroTech recently started pursuing the housing market.
- WaterSignal is a leak monitor and detector that's been installed in multifamily properties in 22 states. (The U.S. loses more than 1.7 trillion gallons per year from infrastructure and household leaks, according to the American Society of Civil Engineers.) David Taylor, senior VP/COO for this Georgia-based supplier, concedes that his product's penetration is strongest in markets with higher water rates. But more property managers want to position their apartments positively with environmentally conscious Millennials. WaterSignal is in the R&D phase of developing a product for single-family homes.
- Nexus eWater has been in the U.S. for about 18 months after launching in Australia in 2009 and has been piloted by KB Home. The product cleans water by injecting air to create foam that moves contaminants—mostly soap—to the surface. Tom Wood, Nexus co-founder and CEO, says his company primarily markets its products through builders, but its price tag of $10,000 is an obstacle. The company is pushing builders to at least make their new homes "recycle-ready," so the system could be installed at a later date. —*J.C.*

COO, respectively, revolve around a town's lack of infrastructure. Water conservation is only as effective as the distribution network that delivers it. And in the U.S., an overburdened and antiquated water infrastructure is badly in need of repair and replacement.

Black & Veatch, which specializes in infrastructure development, quotes the American Society of Civil Engineers' estimate that, by 2020, there could be an $85 billion gap between the current level of spending and needed investments in treatment plants, pipes, and wet weather management. The EPA believes that gap, left unaddressed, could reach more than $300 billion by 2036.

What will it take for the country to stop kicking this can down the road and muster the political will and public support to find $1.7 trillion to fix its existing infrastructure by 2050, plus another $1 trillion to expand the network to meet population and urbanization shifts?

Baden thinks that public-private partnerships could offer one answer and he is convinced that homeowners will demand action if their water bills continue to escalate. "Whether there are droughts or not," Atalla says, "the U.S. will need to address its water infrastructure issues."

Acquiring land occupied by abandoned buildings is one way that builders are tackling shortages.

LOT SHOCK

LAND CONSTRAINTS HAVE BUILDERS LOOKING AT PARCELS THEY MAY NEVER HAVE CONSIDERED BEFORE

By Pat Curry

"Psst! Hey, buddy, I got some Class A entitled lots for sale here. You interested?"

Finding lots isn't that hard yet. But these days, a builder may be tempted to at least stop and listen to that offer. In May, 64 percent of builders told the NAHB/Wells Fargo Housing Market Index that the supply of lots in their market was low or very low—the highest that percentage has been since the NAHB started asking in 1997. "Even back in 2005 when the rate of housing starts was roughly twice that of today's rate, the share of builders reporting shortages was around 53 percent," NAHB economist Paul Emrath wrote in announcing the index.

From Seattle to Chicago to Atlanta, the shortage of Class A lots—and the prices being asked for available ones—is forcing builders to think way outside the box.

GETTING CREATIVE

The Olson Company, a builder/developer that focuses on Southern California's coastal region, takes a can-do approach. Recently the company turned a former Sriracha hot-sauce plant into a site for 88 townhomes. A 120-unit project next to the I-5 was carved out of a former RV park. Parking lots, warehouses, sites with power lines or railroad tracks: you name it, Olson will look at it. "There's always something on the land or challenges with the surrounding areas," CEO Scott Laurie says. "We do a lot of demolition and cleanup that is environmentally related."

In Chicago, Lexington Homes is taking a similar tack. One project was built on the site of a former bowling alley; another site was a truck terminal. "Every piece we've done post-recession has been existing parcels, things in a no-man's land," co-principal Jeff Benach says.

BEING NIMBLE

Demand is high and prices are going nowhere but up. In Seattle, Dwell Development principal Anthony Maschmedt is paying $250,000 to $300,000 for lots that cost half that much five years ago. Colby Henson,

managing broker for Fortress Real Estate, in the Atlanta suburb of Marietta, Ga., reports that prices for acquisition are rising every quarter; something he hasn't seen since 2005. Developers and builders are scouring the market for anything they can find. "We're looking at every little piece of land along I-285 that didn't look desirable before," Henson says. "If you can buy four or five houses, you can put them together to net 40 lots for townhomes. Before, it was too much brain damage."

Even in perennial greenfield markets, such as Texas, builders are facing land acquisition challenges like never before. As a result, Trendmaker Homes, in Houston, has taken an egalitarian approach to land acquisition and development. "You may say you only want to do a project of 1,000 acres," president Will Holder says. "Then you find 75 acres and say, 'Wow, let's do that!' We've done projects of 3,000 acres and projects of less than 100 lots." If anybody has land to show, Trendmaker wants to see it, even if it's less than ideal. "Next year, they may have something perfect for us," Holder says. "We have a very big front door."

RETHINKING THE RULES

Because of the shortage of lots and the prices being paid for them, builders obviously want to go vertical as quickly as possible. But government agencies aren't doing much to ease entitlement and permitting. "There are always new regulations, and lots of issues with water quality," says Tom Dallape, principal of Irvine, Calif.-based land brokerage firm The Hoffman Company. "That always has an impact on lot yield. It doesn't get any easier."

Builders have done a good job in this recovery of buying land conservatively, and the land deals that are taking place are happening, Dallape says, because "buyers and sellers have collaborated to get these things across the finish line." He sees sellers offering financing, supplying infrastructure, and giving buyers early entry to development prior to closing. "We've been involved in every one of those kinds of deals in the last 18 months," he says.

The time frames involved with getting entitlements have led The Olson Company to set a rule that it doesn't close on a parcel until it's entitled, unlike some of its competitors. "We're looking for higher returns for higher risk," Laurie says. "We're seeing competitors taking lower returns for higher risk."

Builders also are taking a long, hard look at location, bypassing municipalities that make the process unnecessarily difficult or lengthy, and trying to do multiple projects in places where they've established a presence. "If you've taken two years to do the first project in a community, you'd be stupid not to be looking for other opportunities," says builder/developer Jerry S. James, president of Edward R. James Companies, in Glenview, Ill. "If you do a good job, you can get invited back. If you're just hopscotching from one community to another, that's a long road."

EVOLVING CAPITAL SOURCES

If there's some good news here, it's that after the near-total shutdown during the recession of funding for acquisition, development, and construction financing during the recession, established builders are able to find financing, whether it's equity or straight debt.

National banks are still shying away from lending to builders, but regional and community banks are doing some deals close to home, and private money is available. "We've seen a decent appetite from hedge funds and private money sources to finance acquisition from initial take-down through entitlement, to even some infrastructure, to get sites graded to blue top," says Shlomi Ronen, founder and managing principal of Los Angeles-based Dekel Capital. Financing partners want to work with developers or builders with experience that's "very specific to the city and the market," Ronen says. "The age of the company is less material than the experience of the team involved in taking the site through the process. That's the key."

Summit Homes, in Nevada, has partnered with San Diego-based Presidio Residential Capital to finance its projects in the Las Vegas market. "I'd classify them as a hedge fund," says principal and division manager Nathan White. "We have no bank loans. It's all equity." Summit has focused on smaller projects of nine to 36 units, which allows it to finish the deals more quickly. "That helps our internal rate of return," White says. "Shorter projects reduce risk."

The downside of small projects, White notes, is that he needs to constantly find new lots and start new projects. The benefits: less exposure to the risk of another market downturn and less competition for the land. "A lot of the public companies have decided not to buy small parcels," White says. "It's worth it for us."

Pat Curry is a freelance writer based in Augusta, Ga. She specializes in writing about housing.

Wind provides 4.6 percent of the nation's power. Solar provides 0.6 percent, but is rising.

POWER PLAY

RISING COSTS AND EXTREME WEATHER DRIVE A SEARCH FOR NEW SOURCES OF TRADITIONAL AND RENEWABLE ENERGY

By Michael Chamernik, Associate Editor

Utility prices have risen, and if the short-term outlook from the U.S. Energy Information Administration and the National Renewable Energy Laboratory is any indication, they will continue to do so. The retail price of residential power will rise from 12.52 cents per kilowatt hour (kWh) in 2014 to about 12.98 cents per kWh in 2017, an average household increase of around $55 per year.

Homeowners may not notice when power is there, but they sure notice when it's not. Extreme weather and earthquakes prompt questions about emergency preparedness and the state of the grid. When marketing homes to a new generation of buyers, builders are aware that energy smarts aren't just something that's nice to have—it's increasingly a feature of a new home that's simply assumed to be there. But where is the power coming from, and how do builders deliver it to homeowners?

THE SOURCES

Currently, coal and natural gas continue to power the nation's electrical supply. Some 4.09 trillion kWh of net electricity was generated in 2015. Of that, roughly 33 percent came from coal, another third from natural gas, and 19.5 percent from nuclear electric power. Of the renewables, conventional hydroelectric power contributed 6.1 percent, wind 4.6 percent, and solar power just 0.6 percent, though solar is on an upswing. Utility-scale solar jumped from 1.21 billion kWh in 2010 to 26.47 billion kWh last year. Distributed solar—electricity produced at or near the point where it's used, from rooftops or small-scale ground-mounted installations—has gradually risen in the residential sector, from 762 million kWh in 2010 to 5.93 billion kWh in 2015.

A CUE FROM CALIFORNIA

California led the nation during the energy crisis of the 1970s and is doing so again, making a strong push toward renewables with an aggressive goal to have half the state's electricity provided by renewable resources by 2030. California's Title 24 energy code mandates that all new single-family homes must be Zero Net Energy (ZNE)—meaning that the amount of energy provided on-site by renewable energy sources is equal to the amount of energy used—in less than four years. Builders in the state are setting themselves up for Jan. 1, 2020 well in advance.

Fresno, Calif.-based De Young Properties builds homes packed as tightly as possible with insulation and EnergySmart features, such as HVAC and water heater systems (EnergySmart is RESNET's standard). In Los Angeles, Dahan Properties stresses eco-friendly design and uses reclaimed wood and recycled tile. The Olson Company, based in Southern California, has been obtaining LEED certifications for homes since 2007. All three companies power houses with distributed solar via PV panels. Dahan's CEO, Mayer Dahan, is especially inventive with solar. He uses roofing systems, parapet roofs, and unique angles to hide the solar panels, giving the buyer a house that is as green as it is aesthetically pleasing. "Most customers have a full solar panel deck on their house but have never seen it," Dahan says.

According to Dahan, eco-friendly features increase building costs between 5 and 7 percent. For Scott Laurie, CEO of The Olson Company, increased cost can turn off buyers. Laurie is trying to get his costs under control, and land is too much of a factor. He says fewer homes will be solar standard in the next few years because buyers won't spend that extra 5 percent to 10 percent. "The green that is the most interesting to people is the green in their pockets," he adds.

Brandon De Young, executive VP for De Young Properties, says that appraisers have been inaccurate when valuing solar systems for lenders, offering, for example, only half retail price. The remainder can't be financed in the home loan, so the buyer needs to pay it in cash. "My biggest fear is that the codes, as they get closer to zero net energy, may potentially force first-time homebuyers out of the market in the short-term because of that extra up-front cost," he says. "Builders aren't going to just absorb the increased cost to achieve zero net energy and not also increase sales prices to account for it. At the end of the day, we still need to make money to survive."

PLUMMETING PRICES

Yet the cost of solar power has dropped 70 percent since 2009. The price for factory-fresh modules used for flush-mounted through-roof residential racking decreased by more than half last year. Pricing for inverters and photovoltaic panels has dropped from about $7 to $3 since 2009. Tax credits, rebates, and other government initiatives can cut the total costs of a rooftop system to less than $10,000. Net metering allows customers to offset energy costs by transferring surplus power back to the grid. What's more, delivery methods go beyond roof panels.

OWNING SOLAR

Lennar, the second-largest home builder in the U.S., has its own solar subsidiary. Through SunStreet Energy Group, Lennar can offer solar in 10 states and 19 metros; it comes with 90 percent of new communities in California. Photovoltaic panels are installed during the construction process. During a 110-day build schedule, installers will arrive around day 40 to perform all the solar jobs. Crews will take a week to install the modules right after the roof is tiled but before the home is painted, and the system is activated during the final electric inspection**.** Sun Street lets Lennar monitor installs and handle quality assurance.

"By incorporating solar as standard up front," says Mike Dufault, the senior VP of operations at SunStreet, "and putting it into a whole community, we make everything look pleasing from the get-go and don't have to worry about a solar company coming in later with a retrofit and messing up the aesthetics."

FARMS VS. ROOFTOPS

Large-scale solar, such as Babcock Ranch (see Farming the Sun, right) can be the most practical choice for master planned communities. Contract durations are flexible, homeowners needn't assume up-front costs and then lose money when they relocate, and rooftop space isn't an issue. Utility solar can be cheaper: In 2015, the price was $0.10 per kW, half that of residential solar. "You don't have to do individual engineering for every few kilowatts of power," says Dr. Elaine Ulrich, a program manager at the DOE who leads a team that works to reduce solar's soft costs, such as business management and installation. "The financing is a bit easier for utilities. All of that can lead to a lower cost for a large-scale solar farm, as opposed to residential scale."

But finding the hundreds of acres needed for large-scale solar can be difficult, while for rooftop solar, support structures are factored in. "It's very cost effective to bolt solar panels onto that structure that's angled and oriented to collect sun," says C.R. Herro, Meritage Homes' VP of energy efficiency and sustainability. Rooftop solar requires no additional space, hook-up or transmission lines, additional buffering, or load-following. Despite the up-front cost to homeowners, homes with rooftop PV panels could provide tens of thousands of dollars of savings over 25 years of life. "Distributed solar has the cost effectiveness and direct benefit to the consumer to fund it that utility-level solar lacks," Herro says. **PB**

For more on Resources, see probuilder.com/water-land-power.

FARMING THE SUN

Located 20 miles outside of Fort Myers, Fla., Babcock Ranch will be an 18,000-acre community of around 20,000 homes, situated around a central downtown with 6 million square feet of retail and office, along with nearly 150,000 acres dedicated to a nature preserve and wildlife management area. The community will draw energy via a new 75-megawatt solar facility that will contain 350,000 photovoltaic panels in a nearby 440-acre site. For Syd Kitson, the chairman and CEO of Kitson & Partners and the developer of Babcock Ranch, utility-scale solar simply makes sense. The price of panels has shrunk over recent years, and the payoff of tax advantages for rooftop PV takes more time than large-scale solar.

Kitson's group partnered with Florida Power & Light, which owns the solar plant. All the transmission lines were in place, and the solar farm is on the premises. Construction started on phase one of the 25-year project late in 2015, and the first of the eventual 50,000 residents will arrive in January. The design took hurricanes into account, with resilient community area safe spaces and a location 20 feet above sea level—above the storm surge. Kitson is convinced that Babcock Ranch can be replicable on a smaller scale. "If it's thought about up front, and if it's part of the infrastructure up front, I think the costs can be much less if it becomes part of the fabric of the community," Kitson says. "We hope that others will do that." *—M.C.*