

The Quest for Home Utility Bills of... Zero

New regulations in California have builders scrambling to make houses more energy-efficient

By Gabriel Kahn • Updated Sept. 13, 2016 11:08 p.m. ET

KB Home is building these houses with thick walls and other energy-saving features to keep up with California's tough energy-efficiency standards.

Photo: KB Homes

SANTA CLARITA, Calif.—The [KB Home](#) development here looks like any other middle-class subdivision in Southern California—rows of stucco houses with tiled roofs and two-car garages—except for the sticker on the entryway of one of its showcase units.

The sticker displays the average monthly cost to heat and cool the home and run the appliances: \$119, compared with \$252 for a standard-built home of similar size. If an owner adds solar panels, the monthly bill would drop to near zero.

Buried inside the extra-thick walls of these homes are layers of high-density fiberglass insulation flanked by rigid foam boards taped together at the seams to forge a thermal barrier. Every crevice, duct and electrical outlet is coated with a special sealant to prevent leakage.

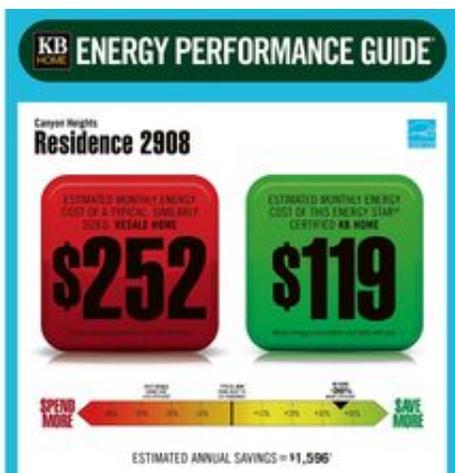
“We’ve turned the home into an airtight fortress,” says Jacob Atalla, KB Home’s vice president for sustainability. All of the nearly 2,300 houses the company built in California last year were equipped with similar energy-saving features. Some had even more. The company presold all of them, at premiums of 1.5% to 3.8% above the price of similar homes without those features.

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The bunkerlike padding is part of the company’s efforts to keep pace with a wave of stringent new regulations set to roll out across the state. By 2020, the California Energy Commission plans to require every new residential building to meet a code called “zero net energy.” Under ZNE, over the course of a year a new house should consume no more energy than it generates from sources such as rooftop solar panels.

The state is still writing the rules that will define exactly how builders are supposed to meet the goal, and some warn the plan is so ambitious that regulators will be forced to roll back deadlines. But the Energy Commission insists it is sticking to its timetable. By 2030, the mandate is set to expand to all new commercial buildings as well.

The commission has been trying to nudge home builders and makers of everything from windows to thermostats toward these goals for years. When the standards do take effect, they will unleash a ripple effect across the construction industry, building-supply sector, even the providers of mortgages and home insurance.



A KB new-home energy sticker. Photo: KB Home

“We are sending a market signal, and we’ve been sending it since the mid-2000s,” says commission member Andrew McAllister. “Not that they don’t grumble about it.”

California’s determination to wring efficiency from building design is a sign of how energy policy has moved to new fronts beyond drilling rights, pipelines

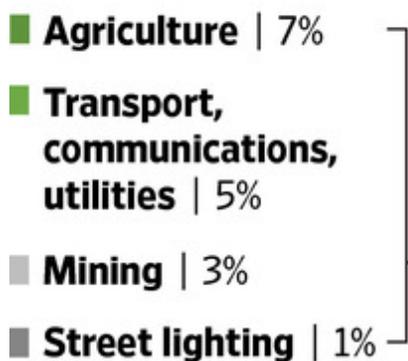
and power generation. While building-efficiency measures here date to the 1970s, they have taken on greater urgency since Gov. Jerry Brown recently ratcheted up the state's policies designed to address climate change: By 2050 California aims to reduce its greenhouse-gas emissions to 80% below the levels it produced in 1990.

The state has already clamped down on emissions from smokestacks, mandated more electric vehicles and demanded utilities prepare to get half their power from renewable sources. But all those measures still don't get the state where it wants to be. So it has doubled down on building efficiency, a tantalizing target: Residential buildings currently account for about 32% of electricity usage across the state; commercial buildings consume 37%.

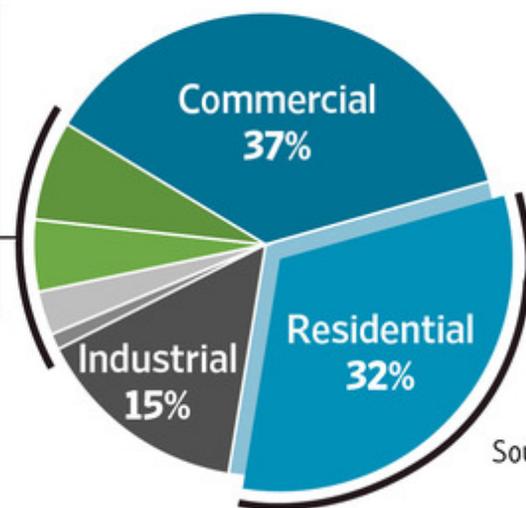
Some in the industry were already embarking on a similar path before the dawning of ZNE. In 2009, [Meritage Homes Corp.](#), which builds about 7,000 homes nationwide every year and 1,000 in California, invited its suppliers to an energy-efficient prototype. "Half the hall left, they wanted nothing to do with it," recalls C.R. Herro, Meritage's vice president for environmental affairs, adding: "That was great, because the half who stayed were all in."

Power Users

California electricity consumption by sector.
Residential is the No. 2 user of power.

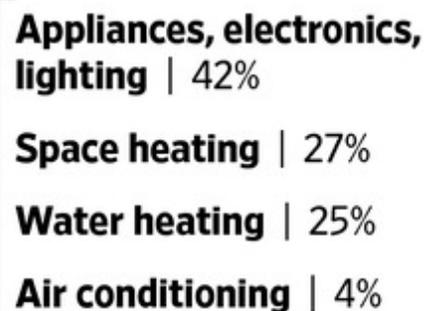


Source: California Energy Commission, Integrated Energy Policy Report, 2008



Where It Goes in the Home

California residential energy consumption by end use



Source: EIA Residential Fact Sheet, 2009
THE WALL STREET JOURNAL.

Meritage began offering its first ZNE-standard homes four years ago, though they represent a tiny fraction of its overall production. In all it has built and sold 100 of these homes in the U.S., half in California. They are priced at the median market price for the local market.

Having shown it can meet that standard, the company is now planning its next iteration—homes that will be sealed even more tightly and consume even less energy, meaning they'll need smaller solar arrays to power them. “ZNE is basically in my rearview mirror,” says Mr. Herro.

He is designing homes in which the wooden two-by-fours, the mainstay of residential construction, are replaced with insulated concrete panels and polystyrene walls that create a sealed envelope. Windows automatically turn opaque to block summer sunshine and go clear during winter daylight hours to maintain a constant indoor temperature. Light switches disappear, replaced by sensors. Highly efficient dishwashers and clothes dryers are connected to a central management system to automatically turn on when power rates are at their cheapest. In-home batteries store electricity from the solar panels. Occupants will barely have to touch a thing. “You will start using your house passively, instead of switching appliances on and off,” says Mr. Herro.

All the interest from builders has drawn more tech companies into the fray. At CES, the massive consumer-technology trade show in Las Vegas, the Smart Home Marketplace section, selling internet-connected thermostats, light dimmers and the like, more than doubled the number of vendors this year from last year, to 124. “The pace of building change is now looking like the pace of tech change,” says Mr. Herro.

Some builders say they welcome California's tougher standards because that's the only way to get the myriad technology and materials suppliers to scale up production and bring down costs.

Without lower costs, the risk is that the efficiency demanded by state policy

can't be delivered statewide without higher housing costs that squeeze first-time buyers out of the market. While many of the bigger builders, like KB and Meritage, can put up energy-efficient housing developments and keep prices close to those for less-efficient homes, that's much harder to achieve for contractors putting up single homes, because they lack the same economies of scale.

“We have to figure out a way to deliver this without hiking the price,” says Dan Bridleman, senior vice president for sustainability, technology and strategic sourcing at KB Home.

Mike Hodgson, chairman of the California Building Industry Association's energy committee, estimates compliance with ZNE could raise the price of a \$300,000 home by \$23,000. A [study](#) from the National Association of Homebuilders estimates that for each \$1,000 rise in home prices, 14,000 California families are [priced out](#) of the market. “We'll have very efficient homes, but I don't know who is going to be able to afford them,” says Mr. Hodgson.

The real challenge in implementing ZNE isn't the technology but the financing. Mortgage writers and insurers nationwide have been slow to account for the value of efficient homes. In theory, lower monthly bills should free up cash that homeowners can use for higher mortgage payments. What often happens, however, is appraisers don't know how to value a solar system, so the appraisal comes in below the sale price. Lenders get skittish. “The result is the home doesn't sell” in many cases, says Sandra Adomatis, a Florida-based real-estate appraiser who has been working to change the way mortgage underwriters value energy-efficient properties.

The California Energy Commission is betting that the costs of solar and other energy-saving features continue to fall, making efficiency more affordable, while electricity rates rise, making efficiency more valuable. “You basically purchase an income stream in reduced energy bills,” says Mr. McAllister, the energy commissioner. “The barrier is getting the financial community to

recognize the low operating costs.”

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