

SPECIAL EDITION 2015

PHOENIX HOME & GARDEN

The Magazine of Southwest Living

Contemporary
Southwest Style



Zero is the New Green

**ULTRA-ENERGY-EFFICIENT
HOMES ARE ATTRACTING
HOMEOWNERS AND
BUILDERS ALIKE**

BY SHAWNDRÉA CORBIN

Arizona sunshine attracts wintertime visitors, migrating birds, and now, a new breed of energy-efficient homes. Net-zero energy (NZE) homes are popping up throughout the Valley, and unless someone points one out to you, you might not even recognize it.

A home is considered NZE when it scores a “zero” or less on the Home Energy Rating System (HERS) Index, which measures a home’s energy efficiency. Standard to-code homes built today have an average HERS Index score of 100, while older homes can range upward of 150. Homes scoring below or around 80 are labeled energy-efficient.

Essentially, any dwelling has the potential to become a NZE home with the right upgrades and appliances. When electricity-generating tools like solar panels are used in tandem with energy-conserving habits and products, a home is able to produce as much energy as it needs, thus zeroing itself, and electric bills, out.



ABOVE: A classic Southwest-style home in Paradise Valley, Arizona, relies on its neighboring 8.6-kilowatt solar panel set to reduce its energy use by 43 percent.

BELOW: Local company Vali Homes designs net-zero energy homes specifically for the desert environment. Here, vertically ribbed steel siding mimics the saguaro with self-shading, undulating valleys that circulate cooler ground air up around the structure beyond.





This energy-efficient home built by Desert Star Construction is enhanced with strategically selected and planted vegetation. Trees with summertime foliage shade windows, while their barren limbs allow light, and warmth, in during the winter.

BATTERIES FOR HOMES

Special batteries allow net-zero energy homes (or any home outfitted with solar panels or on a standard power grid) to store excess electricity that can be used at a later time, such as when production is low or rates are high.

Tesla CEO Elon Musk recently unveiled the company's first brand-name battery for the home, the Powerwall (currently \$3,000 to \$3,500 in price). The upcoming completion of Tesla's lithium-ion battery facility, Gigafactory 1, in Nevada is predicted to reduce the price of the company's electric car batteries by as much as 30 percent.

With a projected ability to produce 50 gigawatt-hours of battery capacity each year, the facility's increased production capability is expected to lower the cost of the Powerwall as well.

Austin Troutman of Vali Homes, a net-zero energy home-building company, believes the Tesla company's initiatives to reduce battery costs are a good indication of what's to come for the housing industry. "This is about energy-efficiency being the best option for the future," Troutman says. "Bringing much improved technologies to the housing industry is going to take things in a wonderful direction."

FROM TOP TO BOTTOM

While harnessing the sun's energy is not a new concept (in fact, the earliest solar power generators were debuted as early as 1870), recent technological advances have allowed for smaller, more efficient products than ever before. Solar shingles, for instance, are composed of powerful photovoltaic cells and constructed to seamlessly integrate with conventional asphalt roof shingles.

These and other "thin-film" solar-harnessing products are slowly replacing the clunkier panels of yesterday and make the first step toward creating a NZE home (literally) more attractive. However, steep price tags remain one of the major opponents of energy-efficient homes. Jeremy Meek, sustainability programs manager at Scottsdale-based Desert Star Construction (DSC), cites high cost as one of two major misconceptions in the industry.

"What we find is that, especially when you're building a new home, if you can get an integrated team on board sooner rather than later, you can make your home extremely efficient and still manage to minimize costs and stick to



Advances in photovoltaic systems have made solar panels thinner, lighter and more efficient overall. Solar panels installed by European company Ecocetera mimic a traditional roof's layered configuration for a more seamless appearance.

your overall budget,” Meek says. From configuring the optimal angles for solar panel production to the strategic placement of windows and landscape plants, the well-thought-out and combined efforts of architects, builders, interior designers and landscapers can easily balance more significant, one-time costs associated with solar panels and other energy-saving materials like insulation.

One of DSC’s recent projects, a NZE house in Paradise Valley, Arizona, relied heavily on the structure’s most basic feature for efficiency. Meek refers to the homeowner’s decision to incorporate thermal mass walls. The walls’ specially calculated thickness allows them to contain, rather than transfer, heat. As a result, outside temperature fluctuations have no effect on indoor cooling efforts.

The second misconception about NZE homes, Meek continues, is that they are only available in contemporary designs. A large number of the NZE homes DSC has built are architecturally traditional or Old World in style. Wrought iron-lined terraces, paved courtyards and wood shutters are just a few of the rustic features the builder has incorporated into these “off-the-grid” homes.

SOUTHWEST CUSTOM

While NZE homes have sprung up practically in every style across the U.S. over the past several decades, adapting their features for desert-specific needs remains largely unexplored. Phoenix company Vali Homes designs NZE residences exclusively for the Southwest. With one home already constructed in central Phoenix, the new company is nearing the completion of its second.

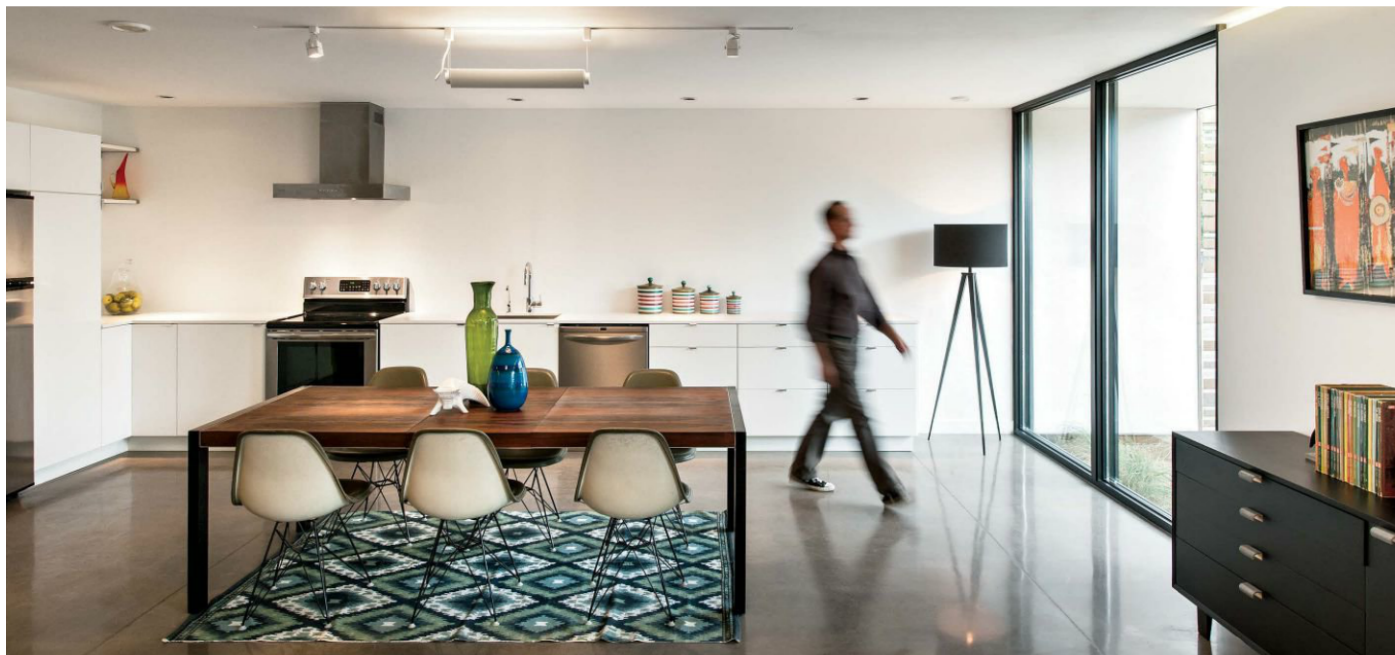
Founder Austin Troutman recalls the thorough research process he and his team embarked on before beginning their first NZE build. They studied the

cooling techniques of ancient ruins and reviewed decades of architectural styles so they could apply what they deemed to be the most desert-savvy practices to the home’s contemporary Southwest design.

Spanning several sides of the house, which features no west- or east-facing windows, the home’s steel siding is modeled after the ribs of a saguaro. The siding’s undulating valleys shade themselves as the sun passes overhead, and even transfers cooler ground air upward, mimicking the cactus’ similarly cooling needle system. The home’s floor-to-ceiling windows also sit beneath deep roof overhangs—strategically placed to keep the bright area cool while still allowing for natural light.

Though the 1,500 square-foot house yielded a \$500,000 price, Troutman says that assessing the true value of a NZE home goes beyond slashed utility bills. “Instead of focusing on incorporating less ‘bad’ into a house, these homes are built holistically. We plan the house so that all of the features work together,” he says. “We take unnecessary chemicals out, add solar panels, provide fresh-air ventilation; you get many more benefits than just lower energy bills. It’s about finding a healthier way to live, and it’s a really big movement happening all over the world.”

Last spring, for instance, California put in place fairly ambitious energy performance goals. A revision to Title 24, The California Building Standard Code, which often paves the way for new regulations throughout the U.S., states that all new and altered residential buildings in the state must be NZE by 2020, with commercial buildings to comply by 2030. “There are many different conversations going on, but it’s inevitable that we are heading in the direction of a very different future in energy use,” adds Troutman.



A net-zero energy house by Vali Homes boasts extra thick walls, sheltered north- and south-facing windows, a ductless Mini Split air system and polished concrete flooring to keep the contemporary dwelling cool in the summer and warm in the winter. “In the summer it feels like 72 degrees inside when the thermostat reads 77 degrees,” says Vali Homes founder Austin Troutman. “In the winter there’s no need to turn on the heat, and in the summer there’s no direct sunlight baking your windows.”



NET-ZERO COMMUNITY

Reaching net-zero isn't only possible in the suburbs. Arizona's first net-zero energy multifamily townhome development, MZ, was completed in Scottsdale in October of last year. The contemporary urban building features spray-foam insulation, photovoltaic solar panels, low-E windows, hybrid hot-water heaters and Energy Star appliances—all included to give each resident the capability to live net-zero.

REACHING ZERO

Valley resident Erik Hansen and his wife decided to pursue their goal of reaching a zero HERS Index score for their home when they outfitted their 1975 hillside house in 2012 with solar panels, LED lights and a tankless water heater. On average, a 28-kilowatt solar system like the Hansens' costs between \$3,000 and \$7,000. The home's panels generate a direct current of electricity that nearby inverter boxes (in this case, in the couple's garage) then turn into alternating currents—the form of energy used to power modern appliances through outlets.

After just a few years, the couple not only met their original goal, they exceeded it. "Now, my home fuels my [Tesla] car for free," says Hansen, who proudly mentions his home's negative HERS Index score. He even sells extra electricity back to his local utility provider.

Excess energy produced by a NZE home is also able to be stored in special batteries. The batteries store electricity when rates are cheap, and then use it to provide backup power on days of slow production. They cost several hundred dollars on average, though, recent events are predicting these prices will drop by as much as 30 percent within the year (see Batteries For Homes, Page 58).

"It would be nice if more solar-panel manufacturers saw this as an investment in our future and lowered their costs even more, but everybody has to make a profit," Hansen says. "It's nice, though, because once the panels are installed, they need no upkeep for 20 years. I love hearing the inverters buzzing away in my garage, just making money for me all day long.

"My wife and I can relax about our consumption," he adds. "There's really nothing that can go wrong with having a NZE house—other than cloudy days, I suppose. But we don't have too many of those out here, do we?" ■

Solar panels were placed on the flat sections of this Scottsdale home's roof. Built by Desert Star Construction, the home generate 5.28 kilowatts of energy and meets all of the performance requirements of the Energy Star for Homes program. Water-wise landscaping and the use of energy-conserving building materials make the home efficient without sacrificing its traditional design.