

VISION WATCH (NEW!)

The Latest on our VISION House® Series of Demonstration Homes

48

Building in Desert Climates

The desert is hot, hot and ever hotter with climate change. The sun is harsh. There is little water. Our Tucson demonstration home is exploring sustainability in the Southwest.

By Christina Birchfield

THOUGH IT MAY BE HOT AND DRY, the Sonoran Desert is beautiful with unique vegetation, such as the saguaro. In most places, light is crisp and clear. Breezes feel velvet. There are centenarians who came to the desert to die in the early 20th century. They were seeking respite from lung diseases or severe arthritis but recovered health and long-life instead.

In the 1950s, with the advent of air conditioning, people flocked to the desert knowing that “little Bill”—the utility company catch phrase of the era, would keep them comfortable indoors. Bills are not little any more. People in standard housing cannot always afford comfort.

Deserts have the advantage of diurnal temperature swing temperature differs as much as 40 degrees from the daily high to the low just before dawn. And that means that even on the hottest days, people can enjoy the outdoors. Savvy architects, builders and interior designers create those outdoor spaces.

Native Tucsonan and green architect Hank Krzysik walks, bikes or takes the bus whenever possible. He harvests rainwater for his edible home garden, and encourages clients through design “to get out of their igloos.”

The biggest challenges to building in the desert, Krzysik says, are water scarcity, extreme climate and the rock/clay geology of the soils. He takes some design cues from the indigenous desert people, who often built with adobe or into cliffs using thermal mass—to moderate indoor living temperatures. They used woven twig-shaded *ramadas* for outdoor living.

To deal with clay soils in our modern era, Krzysik-designed building foundations are often either post-tensioned slabs or



Solid Center. Concrete masonry blocks are filled to create enough mass to mitigate indoor temperature swings.

10- to 12-inch-thick raft slabs. Raft slabs, such as those used on the Tucson VISION House® (www.greenbuildermag.com/vision-house/vision-house-tucson), have steel running through the slab in both directions.

West-facing porches protect from afternoon heat gain and provide places to enjoy fabulous Tucson sunsets. North facing porches protect walls from summer heat gain, when the sun hits the north side of buildings on the longest, hottest days of the year.

Raising the Bar

Though new building is key to his architectural practice, Krzysik is committed to improving the large stock of old buildings. Often clients start with the low-hanging fruit of changing out light bulbs to CFLs and LEDs, adding programmable thermostats and installing low-water-use fixtures. Rainwater harvesting is pretty easy, too. When they start saving money on water and other utilities, they come back for more. It “snowballs,” he says,

continued on page 51

Under Way. Green Builder Media's newest VISION House® is under construction in the Armory Park del Sol Community of Tucson, Ariz. Our first “desert” home, it will showcase best practices for building in hot, arid climates.



Mass Effect. The right concrete mass is key to comfort. Floors are 12" thick. Re-bar reinforces the concrete block walls, which will be filled with concrete.



Hybrid Structure. Wood framing with 24" on center spacing saves lumber and makes for a more efficient wall. Exterior posts visible to the right will support North-facing covered porch.

and is somewhat addictive. Krzysik guides them to install high-performance windows and high-efficiency HVAC systems. Older masonry homes, in particular, benefit from exterior insulation to use thermal mass to moderate interior temperature. Krzysik designs additions with sustainable materials and building practices, such as 24-inch-on-center studs and recycled steel interior walls.

Builder John Wesley Miller's sustainable, award-winning, infill community, Armory Park del Sol, has set a high standard for green building for more than a decade. He was among the first to build a net-zero house. For him, key to fighting heat and harsh sun are his thermal-storage concrete-block exterior walls, high-performance windows and efficient HVAC. His concrete-block walls are filled

solid with concrete and then insulated on the exterior side, which creates a thermal-mass storage system indoors. Thermal mass, he says, operates like a fly wheel. He achieves roof R-ratings as high as 50, by using foamed-in-place insulation on the top of the ceiling, and filling the attic with blown-in Johns Manville fiberglass.

Indoor-Outdoor Connections

Tucson interior designer Robin Motzer uses window treatments and shading inside and out to control light and temperature. Solar screens on west-facing exterior windows protect homes from heat, without obscuring views. Window films can moderate damaging heat and light.



Smart Details. Bricks surrounding the window cantilever from the wall to allow space for the exterior foam insulation and three-coat stucco finish. Trussed rafters include plenty of room for mechanicals, and recycled steel framing has extremely good durability.



Interior color choice often depends on window tinting and shading, which range from blue to a yellowish gold, depending on type and manufacturer. And the outside view can matter too. Motzer once worked with a client who had a colorful flower garden outside her window designed to attract hummingbirds and butterflies. She found that a neutral tone with a gray undertone was best for living in the room, as well as for framing the view.

Color is subjective, Motzer says. Interior trends this season are for blues and neutrals. She prefers to look at projects holistically, and gives workshops to teach others to create holistic desert environs with color. She even makes her own colors. Results always depend

on the people, the architecture and the environment.

Tucson's light and climate lend themselves to blurring the boundaries between indoors and out. Motzer harmonizes interior and exterior color schemes. Pocket doors that fold up and disappear and windows that operate similarly to garage doors effortlessly aid in blurring the boundaries—when the weather is its most inviting.

Krzysik, Miller and Motzer are the team creating the Tucson VISION House® nearing completion in Armory Park del Sol. Desert sustainability practices work; this VISION House® is expected to have an excellent HERS rating of -17 (remember, lower is better and below zero—even better). **GB**

