

# Keeping It Local: Green Building in Texas

BY RIVES TAYLOR, FAIA

Unique challenges to consider when developing in the diverse regions of the Lone Star State.

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Maybe it would be easy in Rhode Island. With only 1214 square miles, it would be a simple thing to develop a sustainable building strategy that would work for the entire state. Texas? That's a problem on a whole new scale. There are 261,000-odd square miles to worry about, with climates ranging from swampland to desert, Hill Country to High Plains.

So while some sustainable building practices will apply across the state, others need to be specific to their region. Houston's muggy climate presents a different set of challenges to Dallas' water shortages and the Hill Country's traffic jams. Savvy architects, engineers, and developers of schools, office and commercial buildings should consider the unique challenges of building in Texas' varied climates and apply the most effective green strategies for their location.

## **Hot, Muggy, and Mildewy: Green Building on the Gulf Coast**

Walk half a block on an August afternoon in Houston and you know the challenges facing building designers in this region: heat and humidity. Conventional buildings rely on heavy-duty AC to keep indoor air cool and remove moisture, but these systems require enormous amounts of energy. How can designers cut energy usage while keeping building inhabitants comfortable?

One green building solution appropriate for the Gulf Coast is to tighten the building envelope, so that inside air stays inside and hot, humid outside air stays outside. New construction materials and techniques (such as double-skinned curtain walls) are being introduced that improve the moisture protection and thermal performance of walls and windows. The challenge in these more tightly sealed buildings then becomes maintaining

air quality; solutions include monitors that bring in fresh air when carbon dioxide levels become too high.

Such monitors are part of a second strategy, which is to improve building performance with systems that monitor the use of the building throughout the day. A school at 9:00 a.m. full of students should be treated much differently than the same school at 4:00 p.m. after most of the students have gone home.

Finally, one of the most effective approaches in the Houston area is to never let moisture and heat reach the building envelope in the first place. Rain screens channel water away to help eliminate moisture, while shading systems keep direct sunlight off walls and windows to cut heat gain. The end result of all of these strategies is buildings that are not only comfortable during Houston's steamy summers but also use less energy.

### **Dry in Dallas: Green Building in North Texas**

The challenge in North Texas is also moisture, except the issue is too little rather than too much. The rapid growth of the Dallas/Fort Worth Metroplex has strained the region's water resources to the breaking point. Inevitably, water supplies are going to shrink as water costs expand.

Just as our culture became accustomed to cheap energy, it also became accustomed to cheap, plentiful and potable water. Conventional building techniques have one set of pipes bringing water in, so the water in the irrigation system, the chiller, and the toilets is the same as the water in the water fountain. Yet most of that water does not need to be drinkable, so the energy spent cleaning that water to that quality is completely wasted. That's why new buildings make smarter uses of water. Separate piping systems can bring potable water to drinking fountains and kitchen sinks and non-potable water to bathroom stalls and irrigation systems.

Even more innovative systems actually produce water for buildings. Rainwater harvesting systems are relatively inexpensive to install and quickly pay for themselves by providing water for any non-potable use. Further, new, advanced systems actually harvest water from the air, combining the critical service of reducing humidity with the creation a new water source. Finally, buildings with high water use can install their own water recycling systems; for example, car dealerships can clean and recycle the water they use to wash cars, dramatically reducing water bills.

### **Thinking Globally by Buying Locally: Green Building in Central Texas**

The Hill Country Mecca of Fredericksburg is famous for its buildings of golden limestone, originally built by settlers in the mid-19th Century. Those farmers and ranchers didn't realize it, but they were pioneering green building techniques. Their limestone walls not only stay cool in the summer and warm in the winter, they also provide a model of sustainable development using local materials.

A new emphasis is being brought to the cost and energy requirements of shipment of materials long distances. The traffic congestion piling up around Austin and San Antonio has brought these concerns home to Central Texas builders, who are more aware than ever of the difficulty of getting materials from point A to point B.

But Texas is lucky: the state produces a wide variety of building materials ideally suited to our climate. By buying locally, developers not only reduce the cost of hauling supplies long distances (and therefore keep traffic off congested roads and carbon dioxide out of the air), they also support local economies and apply building solutions best-suited to local conditions. Take that Hill Country limestone: not only is the stone quarried locally, it also provides excellent protection against heat and humidity, since the material naturally traps moisture.

Other locally-produced building products are making innovative use of recycled materials. Agriboard, made in Texas from agricultural waste such as corn husks and wheat stalks, provides a sustainable alternative to plywood and fiberboard. Concrete manufacturers are now using the fly ash from coal-burning power plants in place of Portland cement; the Texas Department of Transportation has had such success with the product that others around the state are taking notice.

### **Green Building Across the State**

None of these issues are actually unique to a specific region—Austin and Dallas buildings also can benefit from a tightened envelope, and Houston projects can take advantage of locally produced materials. But it pays to pinpoint green building solutions to your local green building challenges. Moving further west toward El Paso, for example, humidity will become less of a problem and heat more; head north to Amarillo and wide temperature swings start to become a concern.

One thing is certain: wherever you are in this big state, it will be necessary to adjust the design to accommodate the climate.

One size no longer fits all. Fortunately, new strategies and materials make a custom fit easier—and greener—than ever before.

**Rives Taylor, FAIA**, is the director of sustainable design for Gensler's South Central region. He is a Texas-licensed and LEED-accredited architect and educator with 25 years of experience in institutional and commercial architecture. Contact him at [rives\\_taylor@gensler.com](mailto:rives_taylor@gensler.com) or +1 713.356.1403.