

## Green-built Home Continues to Enjoy Beauty and Energy Efficiency with Kolbe® Windows



AIA Architect Peter Pfeiffer's Austin, Texas home presents an outstanding interpretation of both the Craftsman style, with its hallmark gabled roofs, overhanging eaves, exposed rafters and square-columned front porches, and green design. After five years, the home continues to inspire architects, builders and homeowners with its enduring aesthetic, reliable performance and sustainable energy savings.

"The 4,175-square-foot home was designed and constructed as a 'green laboratory,' but it was also intended to show that green homes can be fun, functional family dwellings that are a great fit for established neighborhoods," said Pfeiffer, a principal with Barley & Pfeiffer Architects. The firm has gained national recognition for incorporating environmentally appropriate, high-performance design strategies into its building designs. Utilizing extremely accurate proprietary energy modeling software, Pfeiffer figures that he and his firm have designed about 600 projects – including his own – in the last 20 years.

To verify the software-predicted energy savings, Pfeiffer has kept meticulous records on his home's energy consumption. "The results are very gratifying, and are right on track with the extensive computer modeling that was performed during the home's design. We're talking about a five-bedroom house with six occupants – including four kids

– and the bills for electricity and gas are approximately \$225 per month, which is roughly equivalent to homes that are one-third its size."

The Pfeiffer family's custom home is sited on a mid-sized central city lot, orientated to take advantage of the prevailing southeast breezes. This thoughtful positioning maximizes passive cooling in the summer and passive solar heat gain in the winter. In this climate, solar radiation and outside air infiltration are the biggest energy-related culprits, according to Pfeiffer. He notes that tightly sealed, well-built windows are a big factor in minimizing the energy loss coming from unwanted, warm air infiltration.

To ensure the desired energy performance of the home's 50 window units, Pfeiffer chose a mix of Kolbe Heritage Series standard and custom double hung, single hung, awning, transom and casement units. They feature dual-insulating glass units with LoE<sup>2</sup>-270 glass and argon gas for ENERGY STAR® qualified efficiency. The wood window frames are accentuated with pine and Douglas fir interior trim and beige hardware. On the exteriors, most windows were factory-finished in Bay Leaf with K-Kron II high performance finish, while a few were primed for on-site finishing. Pfeiffer chose a flanged window profile "because it is easier to do a superior flashing job with that profile."

The windows on the home's main level are arranged to provide enhanced natural ventilation, and cross-ventilation is generated by incorporating high windows on the upper level. The upper level windows in the top floor act as 'thermal siphons' to exhaust hot air and draw in cooler air. "We love the double hung windows, because they do such a great job of venting. The awning windows are great, because they can even be open in a rainstorm, enabling us to enjoy the cool, scented breezes," says Pfeiffer.

He adds, "We have customized security elements on the double hungs, so we can lock the lower sash and still have the top sash open." The upper sash also were custom-sized,



with 1-1/8" inch performance divided lite or true divided lite grilles and ovolo glazing to provide consistent horizontal lines, in keeping with the home's Craftsman style. Grand Openings, the Austin-area millworking company, provided the window customization and installation services.

The home's door and window overhangs were sized and designed for optimum solar shading and daylight reflectance. The naturally lit, open plan and stair tower brighten up the interior, while minimizing direct sunlight and glare. Ample use of direct and indirect high resolution fluorescent lighting saves electricity while also helping to keep the home cool and comfortable.

"The bulk of home energy costs in central Texas are spent on cooling, so protection from unwanted solar heat gain was a key strategy for us," Pfeiffer says. "Passive solar is the only way to go. It's cheaper by a factor of about two-thirds to build a house that uses passive solar solutions – including solar shading – and is designed to conserve energy, than it is to build an active energy-saving house. That's why my house, or any other for that matter, can look traditional and still be a high energy performer."

Pfeiffer's home is so energy-efficient that it qualifies for Austin Energy's Green Choice program. The program lets homeowners tap into wind-generated energy, and Austin Energy guarantees to hold participants' utility rates constant

for a period of up to 10 years. The home received the highest point rating in the history of Austin's Green Builder Program at the time, the oldest and most established Green Building program in the country.

Preventing unwanted air infiltration and managing airflow are critical in creating an affordable green residence. A typical home HVAC system leaks 25% to 30% of its air, but Pfeiffer's home is so tight, thanks to its weather-tight Kolbe windows, as well as the outside-insulated, sealed ducting system, that even minimal leakage can produce back drafting down the fireplace chimney flue when the air conditioning is on in the summer. Pfeiffer says his home tested out at a mere 8% leakage, but he is on the lookout for ways to cut the leakage to 5% or lower.

Beyond the personal testimonials of the Pfeiffer family and energy-savings kudos of Austin's Green Builder Program, *Fine Homebuilding* magazine honored the residence as "one of the greenest homes in America." The home also was showcased on the 2004 National Green Building Conference Tour, the 2002 U.S. Green Building Council's International Conference & Exposition Tour, and the American Institute of Architects' Austin Homes Tours.

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