GreenBuilder®

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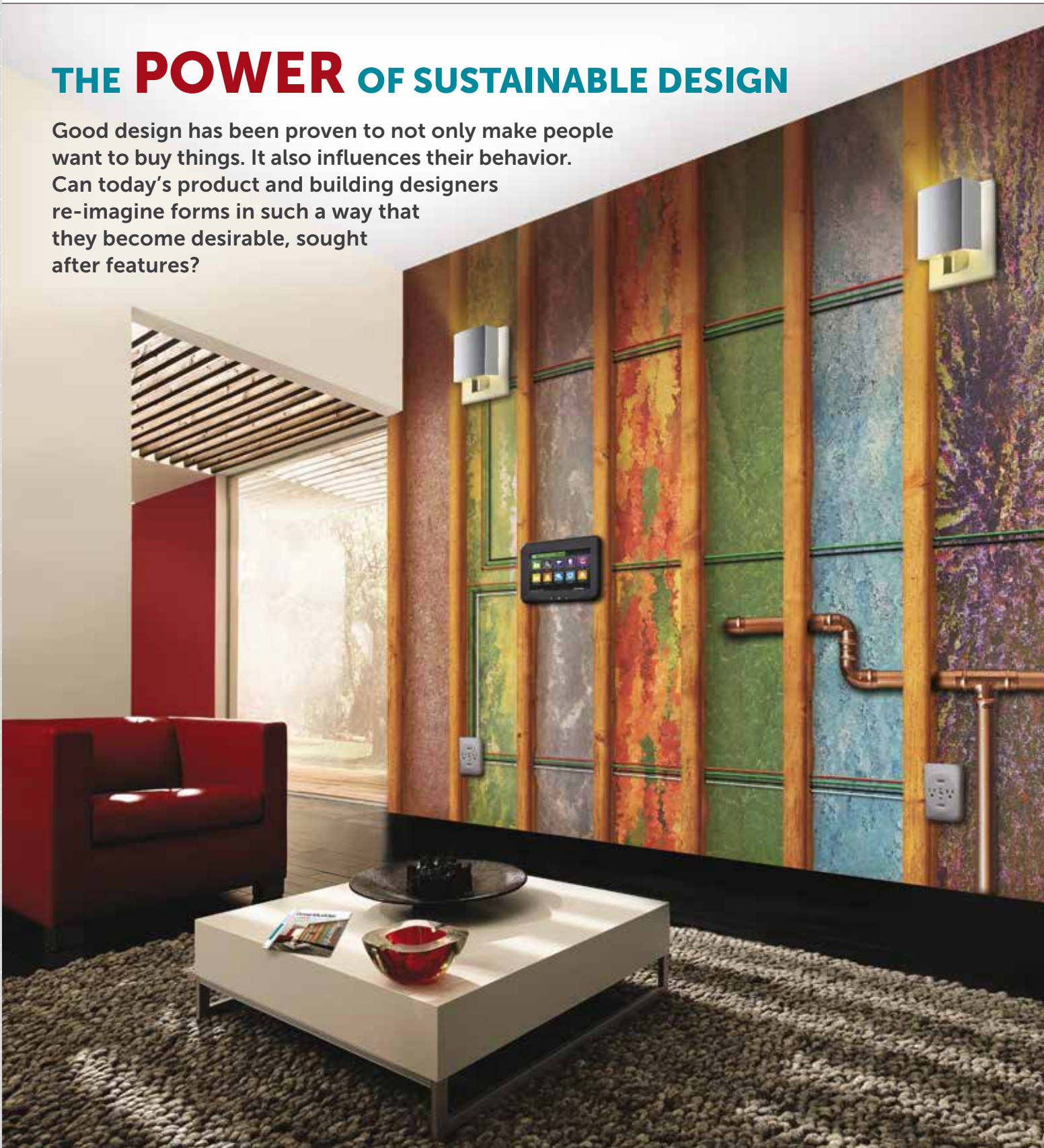
THE POWER OF SUSTAINABLE DESIGN

Good design has been proven to not only make people want to buy things. It also influences their behavior. Can today's product and building designers re-imagine forms in such a way that they become desirable, sought after features?



HERS WATCH
News and Case Studies about HERS-Rated Projects from RESNET

Low-Impact Luxury

An energy consultant and a HERS Index certifier helped this custom home in New Canaan, Conn., achieve both luxury and efficiency.

NATE AND ETTA KANTOR wanted to live in a truly green home. To achieve their goals, the couple wanted to work with a contractor who shared their vision of green living and energy efficiency, their concern for the environment, and their rigorous attention to detail as they undertook major renovation to their 5,000-square-foot Adirondack-style cabin. They turned to Chris and Mike Trolle of BPC Green Builders to build the home, which was designed by architect Jim Edgcomb.

RESNET Home Energy Rating System (HERS) Index certifier Steven Winter Associates provided the energy modeling, and consulted with the couple to help them narrow their viable options for the thermal envelope, HVAC and fixtures. Comprehensive inspections helped identify construction techniques that could be enhanced, and final testing using the HERS index confirmed the value of third-party oversight.

PHOTOS COURTESY STEVEN WINTER ASSOCIATES

Light Footprint. An Adirondack-style home in idyllic New Canaan, Conn., incorporates the highest levels of sustainability. The near net-zero energy (HERS 14) custom home achieves luxury living with minimum environmental impact.

From the Outside In

"Our focus is always on the building envelope first," says Edgcomb. "Once you have a durable, high-performance envelope, you can add the systems." Insulating the house was an extensive process. Crews insulated the precast concrete walls with 1" of rigid foam board followed by spray foam. The floor slab sits on a 6" bed of crushed stone and 2" of foam board. Above-grade walls are 2'x6', 24" OC. Roofing was framed with 2'x12', also 24" OC.

Contractors filled the void left by 2'x3' strapping in the basement and other parts of the house with spray foam insulation, further increasing R-values (R-58 roof, R-31 above grade, R-39 basement).

Solar thermal panels heat a 1,000-gallon water tank, which is used like a battery to store heat for the house, domestic hot water and pool; a pellet boiler with automatic feed supplies any demand not met by the solar system; a wastewater heat-recovery system reuses the master shower water.

Knowing that fireplaces are a large source of air infiltration and heat loss, a specialized contractor was hired to design the fully sealed, wood-burning fireplace. A recycled rubber and plastic roof that resembles slate shingling houses 14 photovoltaic panels and solar thermal panels heat the ionized pool. Overall, 94.2% of the home's energy needs are met by solar technologies.

Nearly Off-Grid. ourteen photovoltaic panels power the house, while an additional set in the backyard provides heating for the pool. Overall, 94.2% of the home's energy needs are met by solar technologies.

Double Insulated. Crews insulated the precast concrete walls with 1" of rigid foam board followed by spray foam.

"The well-defined and robust thermal envelope offers homeowners the best ROI strategy for any home," notes Karla Donnelly, senior sustainability consultant for Steven Winter Associates. "Our load analysis of the home showed that triple-insulated windows, strapped walls/roof framing, a highly insulated basement level slab/wall system, and a very tight building envelope required a very small heating system for the home as compared to a typical home of this size. This minimizes shorter life-cycle systems (mechanical equipment) and maximizes longer life-cycle systems (thermal envelope)."

Chris Trolle says the best return on investment was on glass: "We used a triple-insulated Loewen window. Although this is an expensive feature, by focusing on it in any home you are able to use a smaller mechanical system."

The extra 1½" of R-4.5 insulation from adding strapping to the inside of the 2'x4', 24" OC walls gave the walls a robust R value. The warmer interior surface temperature of the glass and windows meant the heat could be set at 64°F with the interior remaining comfortable.

Tweaking the Mechanicals

"The mechanical side ended up more complicated than initially planned, as we settled on three heating systems: solar thermal as the primary non-fossil-based heating, a European wood pellet boiler as backup heating (new to the U.S. market), and a high-efficiency sealed-combustion gas-fired boiler as secondary backup heating," notes Donnelly. "All three heating systems support a hydro air heating system for most of the home with radiant heating added to the living room, dining room and master bath. Adding to the complexity, we also had an outdoor pool and hot tub needing hot water—so why not support these loads with the same equipment? As a result we have many heating systems supporting many loads."

"Because of the complexity of the installed systems, the team used the energy model to plug and play thermal envelope and HVAC options. "It was always the goal of the Kantors to build a zero-energy home; predicting the HERS Index was integral to that planning process," Donnelly says. Ultimately, the house garnered a HERS 14 score.

Final Analysis

The Kantors realized their dream of green living, with upgrades to their house that were initially estimated to reduce household energy bills by 79%—a savings of more than $4,800 annually. After living in their home for over a year, the Kantors reported that they had saved even more than anticipated, adding that the energy-efficient home is extremely comfortable and quiet. **GB**

WHY RESNET?

The RESNET HERS Index rating provided an easy-to-understand, accurate assessment of the energy efficiency established in the Kantor home. According to SWA, its RESNET certification has been crucial to implementing the programs most popular with clients like the Kantors. Those programs include LEED for Homes, National Green Building Standard, and Energy Star Homes. *Visit* **www.resnet.us** *for more information on getting a HERS rating for your homes.*