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CONSTRUCTION**

Best Green Houses

Cape Case Study: A fledgling studio melds architecture and technology to design two homes on Cape Cod

Truro Residence and Modern Lake House
Truro and Orleans, Massachusetts
ZeroEnergy Design

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By David Sokol

Truro Residence



Photo © Eric Roth Photography

Cape Cod immediately calls to mind images of rugged, shingle-clad saltboxes and weather-beaten Greek Revivals. Yet the Cape is also home to stunning works of Modernism, which embrace the elements in a manner befitting a vacation land. Indeed, The Cape Cod Modern House Trust was incorporated in 2007 to protect Jack Hall's visually featherweight Hatch Cottage (1960), the Kugel/Gips House (1970), a dynamic bundle of volumes by Charles Zehnder, and other examples dating from this period.

Both legacies continue to this day. There are the gargantuan vacation homes gracelessly parroting the region's most historic predecessors and, more sparingly dotting the region, works by the likes of ZeroEnergy Design (ZED). This Boston-based firm, founded by five recent Cornell grads, references past, present, and future: Two of its recently completed homes on Cape Cod, a 6,400-square-foot beach house for a large blended family in Truro and a 1,950-square-foot lakefront building nestled in the woods of Orleans, are tough like the peninsula's oldest buildings, Modernist in form, and sustainable in their conception...

That requires an equally multifaceted team. In this case architect Stephanie Horowitz, AIA, works in tandem with Jordan Goldman, LEED AP, who is responsible for energy modeling and mechanical design. The team meets from the get-go, establishing a parti and determining site, climate, and other criteria. "From there it's a design-driven process," Horowitz says of creating the basic form and layout. "It's about meeting the client's needs from a design standpoint functionally and aesthetically. And then it's through an iterative energy-modeling process that we fine-tune the final design. We continually go back and forth between design and performance."

Modern Lake House



ZED typically models residential building performance using TREAT (Targeted Residential Energy Analysis Tool), double-checks its work in the software REM/Rate, and then exports the TREAT data into a proprietary analysis tool that determines financial feasibility.

Photo © Michael J. Lee Photography

Truro Residence



Photo © Eric Roth Photography

Digital methods do not necessarily yield high-tech ends. Take the intuitive solutions. Responding to the fact that the Truro family's seven children are all grown, ZED carefully orchestrated HVAC zoning, effectively allowing large swaths of the house to be closed off when not in use. The building form, two parallel wings jutting toward Cape Cod Bay and topped in sail-like roofs, expresses the internal segmentation.

Modern Lake House

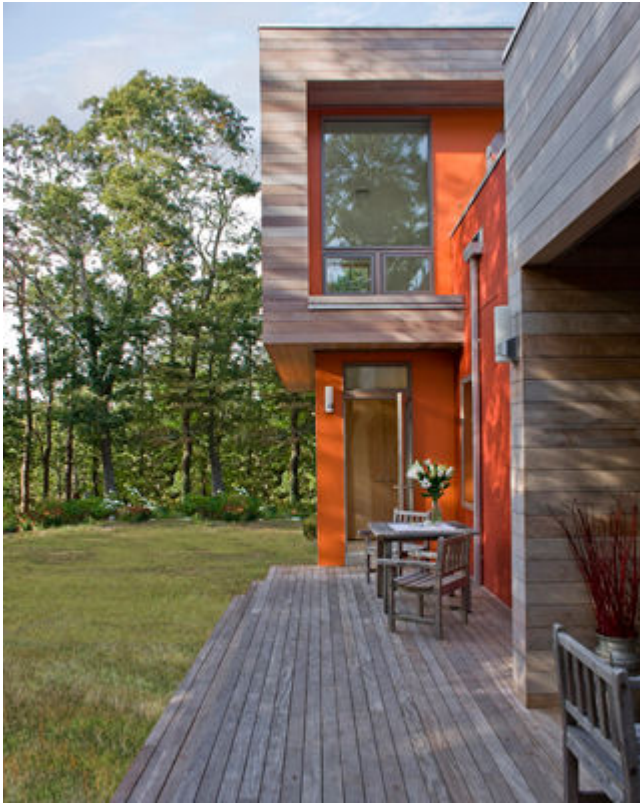


Photo © Michael J. Lee Photography

For the Modern Lake House, ZED deputized surrounding foliage to lessen solar gain, and designed cantilevered elements to act as additional shading devices. Both projects feature radiant heating.

Modern Lake House



Photo © Michael J. Lee Photography

ZED also makes use of well-known sustainability tactics, though with the exactingness afforded by computerization. Icynene open-cell insulation was sprayed into both homes, and in Orleans, it is supplemented with both rigid and closed-cell materials. "An additional benefit of foam is that it firms up the structure," Horowitz notes.

Truro Residence



Photo © Eric Roth Photography

The durability of Cape Cod's centuries-old homes is now obligatory here: Local building codes incorporate the threat of hurricane-force winds, Horowitz explains, so the entire western elevation of the Truro home is steel-framed underneath its FSB-certified, vertical-grain cedar skin. And the large, west-facing picture windows that provide views to Orleans's Pilgrim Lake can withstand the impact of a cannon-shot two-by-four.

"We're looking to reduce energy use through solid design principles and through our verification process," Horowitz says of ZED's approach to designing its commissions. "It's only once we've really optimized the base building that we look at the technologies involved in bringing that to the next level."

Modern Lake House



Photo © Michael J. Lee Photography

To ascend to that next level, the Truro and Orleans houses are fitted out with 2.3-kilowatt and 11.7-kilowatt rooftop photovoltaic arrays. The lake house is ready to take a solar-thermal system once the owners, one of whom is retired already, decide to occupy the house full-time. (A surplus of hot water currently would damage systems.)

Heat recovery ventilators are installed in both houses, too. "We're not going to maximize south-facing glazing because we read it in a textbook," Horowitz concludes of ZED's method. "Rather, we run five different glazings and figure out what kind of dent that makes in our overall energy performance."

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