sun catcher
arbor house, chilmark, mass.

architect: moskow architects, boston

builder: McGrath Carpentry Service, Quincy, Mass.; **structural engineer:** Reginald Roome, Boston; **environmental consultant:** Mark E. Kelley, The Hickory Consortium, Harvard, Mass.; **size:** 800 square feet; **construction cost:** Withheld; **photos:** Greg Premru Photography

The Massachusetts island of Martha's Vineyard may be a summer paradise, but come winter, bone-chilling New England weather takes over. Boston architect Keith Moskow's clients visit their Vineyard vacation home year-round, though, and they wanted a four-season guesthouse to go with it. The catch? They envisioned a building that could be entirely heated and cooled without fossil fuels. They approached Moskow, AIA, and asked him to design them a passive solar guesthouse.


Photo: Greg Premru Photography

Working with environmental consultant Mark Kelley, Moskow and partner Robert Linn followed basic passive solar design principles. They aligned the house along an east-west axis, orienting windows toward the south for solar gain. Kelley assigned them a ratio of eight square feet of thermal mass surface area to one square foot of glazing, a formula they faithfully adhered to. The 800-square-foot guesthouse's slate floors make up most of its thermal mass, in addition to concrete subfloors and chimneys. “The mass stores heat to be used later,” says Kelley. “It also absorbs heat during the daytime so the house doesn't get too hot.”


Photo: Greg Premru Photography

Two wood-burning stoves serve as supplemental heat sources. “The idea is that in winter the house will be warm when one arrives,” says Moskow. “Then the guests can tweak it up with the wood-burning stoves.” In another low-tech, high-yield maneuver, an inline duct fan takes heat that's risen to the ceiling and circulates it back down to the floor. A “summer fan” performs in a similar fashion, forcing warm ceiling air out through a chimney. Carefully planned thermal breaks and a well-insulated foundation and footing help the house maintain a high level of energy efficiency. And a tankless hot-water heater provides warm water on demand, rather than consuming energy 24 hours a day. No matter how strong winter winds blow, this low-impact little house will block their chill.