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a renewable life

A FAMILY CREATES A
SUSTAINABLE HOME
ON 44 RURAL ACRES
IN VERMONT'S GREEN
MOUNTAINS

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PILL-MAHARAM ARCHITECTS

A WIND TURBINE generates nearly all the power the house uses. A modern take on a Vermont farmhouse, the building is finished with simple mustard-green clapboards, corrugated metal siding, and a standing seam metal roof that evoke the land's agrarian past.



THE HOUSE IS HEATED by a low-temperature radiant system in the 4-inch concrete slab and by sunlight that pours through south-facing, triple-glazed windows. The little-used woodstove by the staircase (ABOVE) provides auxiliary heat. In the adjacent kitchen (LEFT, TOP AND BOTTOM), the maple cabinets, butcher-block top on the work island, and the pigmented concrete countertops were all locally sourced.



DAVID PILL AND HILLARY MAHARAM DISCOVERED the paradox that defines Vermont: When you leave the highway and travel into the countryside, you're not moving away from community, you're moving toward it.

Several years ago, Pill and Maharam, who met in 1985 as students at the School of Architecture at Washington University in St. Louis, made the decision to leave their home in the Boston suburb of Winchester. They loved

their 300-year-old farmhouse, the barn Pill had renovated as a studio for his small architectural firm, and the generous acre-plus yard and gardens. But "we were aching to live in the country," says Maharam. "We wanted to be somewhere else."

A deep commitment to the environment also guided their move. Pill has practiced green design and building principles for 15 years, long before it was a national trend, and Maharam spent a decade in landscape installation and design. Their shared goal was to renovate or build a home that was energy-efficient to the small-



est detail and that would generate as much power as it consumed. They also refused to build on land that had escaped development in the past. “We looked everywhere, and it was very difficult,” says Pill. “Because we wouldn’t consider pristine land, we were looking at a lot of old houses — and we knew how much effort it would take to make an old house energy-efficient.”

In June 2005, they finally found their spot, a 44-acre parcel in rural Charlotte, Vermont, some 20 miles and many rolling meadows away from bustling Burlington. The property met all their criteria: topography with tremendous potential for wind power, wide-open exposure to the free heat of the sun, and plenty of room for gardens, animals, and hiking trails. The only hurdle? A derelict horse-riding arena sat precisely where they wanted to build. Ethically, Pill and Maharam couldn’t send the metal to a landfill. In a lucky case of converging interests, a local family offered to dismantle the arena right down to the roofing screws and haul it to their own land, where they planned to rebuild it as a commercial equestrian facility.

That August, the family, which includes 14-year-old Jake and 8-year-old Liza, moved to Vermont and lived in a rented house while Pill perfected his plans for a building with maximum energy efficiency that could be powered solely by electricity generated by a wind turbine. Installed in a narrow valley that sweeps north through the back of the property, the turbine was up and running midway through construction, so it even provided power for the builders.

Pill sited the house along an east-west axis for maximum solar gain, finding the ideal balance of south-facing windows to walls. It is a simple form with two identical stories stacked one on top of the other. “If your goal is maximum efficiency in a cold climate,” says Pill, “you can’t have a sprawling floor plan. In our house, the space being heated on the second floor is directly on top of the space being heated on the first floor. We have tremendous light exposure, with one compact roof to contain the heat.”



THE MASTER BATHROOM (ABOVE) features a freestanding oval soaking tub and a glass-tile shower with a low-flow showerhead. A pocket door between the master bedroom and bath (TOP) provides privacy. Built-ins along the bedroom wall (FACING PAGE) are used for seating (a favorite spot for Maizie, the family’s Alaskan husky) and stowing books and clothes.



The 2,700-square-foot home is a modern take on a classic Vermont farmhouse. A porch wraps around the front of the building, a long, narrow rectangle with mustard-green clapboards. Two simple bump-out bays, one on each side of the house, covered with corrugated metal siding evoke the land's agrarian history.

The interior is uncluttered and minimalist. A vestibule inside the front door traps cold winter air as you pass through a second door to the entry hall and mudroom. Ahead, an open kitchen and dining room curl around the central staircase to the living room beyond. Upstairs are the children's bedrooms and bath, a big office that doubles as a guest room, and the master suite, where windows on three sides look out toward the Green Mountains, an old apple orchard and rugged ravine at the back of the property, and the spinning turbine.

"I can wake up every morning and see how much energy we're generating," says Pill. He's kidding ... but not much. The U.S. Green Building Council has awarded the house its highest rating, platinum, through its rigorous Leadership in Energy and Environmental Design (LEED) program.

Sun pours through triple-glazed windows on the south side, warming the rooms and soaking into the 4-inch-deep concrete slab on the first floor. A low-temperature radiant heating system also runs through the concrete floor. Because the house is super-insulated, the second floor needs no heat beyond the sun and the warmth that rises from downstairs. "We have a woodstove for auxiliary heat, but we rarely need to use it," says Maharam.

There is no air conditioning. "In summer, we open the windows on both sides of the house at night, which cools it down," says Pill. "We shut the windows in the morning and it stays comfortable." In houses this airtight, it's important to provide ventilation in winter to maintain air quality, so Pill installed a filtration system that exhausts the stale air and brings in fresh.

When choosing building materials, Pill and Maharam tried to buy locally whenever possible. The beautiful maple on the floors and kitchen cabinets is from Lathrop's Maple Supply in Bristol; the reclaimed fir columns were salvaged from an old mill; the stone walls were built from rock found on the property. In the kitchen, sturdy maple butcher from the Vermont Butcher Block



THE HOUSE IS SITED along an east-west axis for maximum exposure to the light and heat of the sun. The family's goal is to create a self-sustainable household, including growing or raising most of their food. To that end, a deluxe chicken coop (FACING PAGE) houses a flock of 28 chickens. They also planted apple trees and a large vegetable garden near the house.

DESIGN DECISIONS

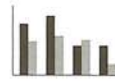
David Pill and Hillary Maharam built a house that generates as much power as it uses. Here's how they did it:



The electricity the wind turbine generates powers the house. Any excess flows to the local power grid, which issues them an energy credit. Last year, the turbine generated 6,657 kilowatt-hours and the house used 7,081, for a net use of 424 hours. The total electric bill for the year, which included heat and hot water, was about \$60.



An electric-powered, ground-source heat pump generates heat for hot water and the radiant system. The 50-degree groundwater is heated to only 90 degrees for use in the low-temperature radiant system. By way of contrast, conventional electric baseboards are heated to 180 degrees, which requires far more energy.



Energy-10 simulation software helps architects quickly identify energy-efficient strategies such as passive solar heating and high-performance windows. Pill used Energy-10, plugging in the building's mass, location, and type of heating, to calibrate the precise balance of windows to wood.



For at least half the year, a clothesline is used to dry laundry. Other energy-saving details: An exhaust system keeps the home ventilated without opening windows in winter, and shower drains are outfitted with copper coils that reclaim heat from the used hot water.



& Board Company in Williston tops the work island, and artisans at Red Concrete in Burlington crafted the pigmented concrete counters.

In moving from suburban Boston to Vermont, Pill and Maharam made a deliberate choice to leave one lifestyle for another. The house they built and the life they're living in a quiet corner of the Green Mountains reflect that. Though they've made lots of friends, they spend most of their free time at home.

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"We like to be on our land and explore it," says Pill. "Being outside, being connected to the landscape, is a big piece of who we are." With each turn-

ing season, they feel a stronger link to their home and to Charlotte. "In Winchester, hundreds of people lived within a mile of our house," says Pill, "but we only knew a handful of our neighbors. Today, we live in a place that's far more rural; the people are all spread out, yet we feel a much stronger sense of community."

"Part of that is where we are now, in our lives," adds Maharam. "When you're younger, you just sort of arrive at your first place; you land there. As you get older, you often come to a place because you've made decisions about who you are and how you want to live your life. We've come to this place with a much stronger sense of who we are and the things we want to move toward." ■