

Maine Home

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+DESIGN

Biddeford's North Dam Mill

At the epicenter of
the city's reinvention

How Green Can You Go?

The first BrightBuilt Barn
gives back to the grid

A Beacon of Green Design

A Rockport studio sets a standard
for pre-fab sustainability



by Debra Spark
Photography Trent Bell



BrightBuilt Barn is a small blue outbuilding that sits atop a hill full of birch trees in Rockport, Maine. It is also an answer to the question, How green can you go? Or more precisely: What would happen if you asked some of New England's top green builders to make the most eco-conscious structure possible, a cutting-edge building that would be beautiful, affordable, durable, sustainable, and reproducible? And what if you did all this in Maine, a state in which the challenges of heating cannot be ignored?

Keith and Mary Collins, a physician and artist respectively, first asked these questions when they were looking to build an office and studio next to their Rockport home. Now, two years later, they have a sustainable structure on their property, one that generates enough electricity to give back to the grid. Indeed, on days when BrightBuilt Barn is working most efficiently, the electric meter runs backward, working as a virtual outboard motor for the couple's home, while paying off the carbon debt incurred in construction. And how will the couple know when the environmental bill has been settled? Well, the building will help them estimate. A computer panel in the loft reports on BrightBuilt Barn's energy consumption, and an outdoor light skirt acts like a mood ring, glowing green when the structure is contributing energy to the grid, red when it's in user mode. "Ordinarily," says Phil Kaplan of Kaplan Thompson Architects, the firm that undertook the project, "there's a big disconnect with what we're doing with energy in our homes. If we had to feed coins into the wall in order to turn the lights on, we'd behave differently."

"So many green structures being built are not practical for living," says Keith Collins. "They're more like a science project than a house. We wanted something that looked inviting, cozy, and attractive." Collins also wanted a building that could serve as a prototype for other projects, so he requested what he calls "state-of-the-shelf"—rather than

Its light skirt glowing green for energy efficiency, BrightBuilt Barn stays warm in winter with no furnace. Solar panels on the roof generate all of the structure's heat and electricity.



state-of-the-art—technology, something that wouldn't become obsolete ten to fifteen years down the road.

"It's called a barn because that's how Keith imagined it: romantic, part of the Maine landscape," says Phil Kaplan. "From day one, Keith was very genuine to the fact that this project is really to make Maine better." When the project began, Collins was worrying about climate change: "I felt it was time for people to try and see what they could do as individuals."

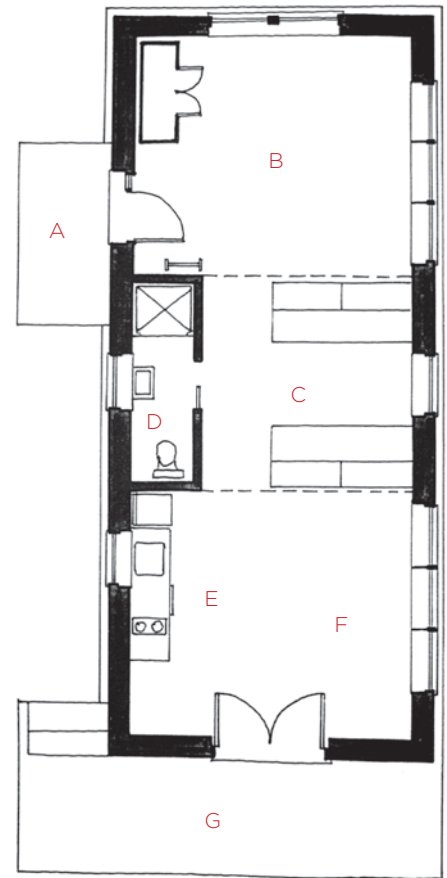
Inside, BrightBuilt Barn (BBB) consists of three pine-paneled rooms—an art studio with kitchen, an office with a library ladder leading to a loft, and a central room with a small adjacent bathroom. The walls separating the rooms are actually moveable bookcases, so the interior can be reconfigured as a one-bedroom home or a guesthouse. High-efficiency doors and windows (the latter framed between translucent nanogel panels) let in light. Outside, the south-facing roof has photovoltaic solar panels and solar tubes. There is a pergola for shade in the summer and a small porch facing the conservation land that borders the property. In the upstairs loft, there are some clues to how BBB works, including a hot-water heater storage tank and a heat-recovery ventilator, as well as an interesting absence: there's no furnace. That's because the structure is super-insulated, using 70 percent fewer Btus (British thermal units) than an ordinary house. In the fall and spring, the normal activity of living—physical movement, cooking, the running of hot water—heats the building. "It's like living," says the project's extensive website, "inside a big down sleeping bag, made snug and warm by your own body heat." In the winter, the primary additional heat source is hot water, which runs through the radiator to produce hot air. Most days, the solar thermal system generates that hot water. On particularly cold days, an outdoor heat pump helps out. And, in subzero temperatures, electricity runs through coils in the hot-water heater.

But that's not all that makes the building environmentally sound. "It's hard to divorce a building from the process [of construction]," says Phil Kaplan. BBB was a true—and well-organized—collaboration among client, architect, engineer, designer, solar electrician,



Facing page: A kitchen countertop of cast concrete sits above cabinets of Baltic birch (top left). High-efficiency LED fixtures (top right and bottom left) provide lighting with minimal energy use. A ladder (bottom right) offers loft access, then tucks up against the wall when not in use.

Bookshelves with sliding doors (above) serve as movable walls dividing the interior space.



- A Entry
- B Office
- C Gallery
- D Bathroom
- E Kitchen
- F Studio
- G Deck

builder, and LEED (Leadership in Energy and Environmental Design) consultant. Explains Kaplan, “It’s very different from when an architect goes in and says, ‘Whoa-ha! Here it is!’ and then the rest of the ducks have to fall in a row.” An important member of the team was Tedd Benson of Bensonwood Woodworking Company, a New Hampshire firm that makes high-performance buildings by constructing energy-efficient panels off-site then going on-site to assemble. Because Bensonwood computers precalculate every woodcut, there’s no waste of materials—the firm burns what little wood it doesn’t use for projects to heat its buildings—and with BrightBuilt Barn, there was no waste of time either. The structure was put together in a mere three days.

When Benson first began talking with Kaplan Thompson Architects about creating a net-zero building, his firm was already engaged in

research and development to find better ways of building. Rather than “reinvent the wheel,” says Benson, they applied what they had discovered while building a home in Unity. This spirit of using knowledge from one project to build another is very much part of BrightBuilt Barn, not only because the project hopes to become a prototype for other green efforts, but because the building’s technology is open source, thus available to anyone. Here in Maine, Kaplan points out, BrightBuilt Barn could be reproduced as an off-the-grid house, as a camp in a desolate spot, or as an island home (with helicopters bringing in the “complete envelope” of roof, floor, and walls from Bensonwood). In the end, though Phil Kaplan is invested in his particular package—which he’s pricing under \$200,000—his goals are more democratic: “We want more buildings like this. The idea is to have BrightBUILTS everywhere.” **MH+D**



Cathedral ceilings and exposed timber frame (facing page) are visible throughout the structure.

Offering views off its back deck (above), BrightBuilt touches lightly on the landscape, seeming to float above the ground.

THE CREW

Architect: Phil Kaplan, Jesse Thompson, Robin Tannenbaum, Michael Wilcox (Kaplan Thompson Architects)

Builder/Timber Framer/Designer: Tedd Benson, Hans Porschitz, Paul Boa, Lovell Parsons (Bensonwood Woodworking)

Builder/On-Site: Alan Gibson (Gibson Design/Build)

Landscape Architect: Ann Kearsley (Ann Kearsley Design)

Mechanical Engineer: James Petersen, James Parkington (Peterson Engineering)

Mechanical Contractor: Pat Coon, Fortunat Mueller, (ReVision Energy)

Environmental Consultant: Gunnar Hubbard, Danuta Drozdowicz (Fore Solutions)

Lighting Designer: Greg Day (DayMatero Studio)

Concrete Artisan: Jon Meade (Jon Meade Designs)

Casework: Liza Wheeler

Consultant Engineer: Brian Lazarus (Opus One Studio)

Consultant: Kent Larson (MIT Open Source Building Alliance)

LED “Light Skirt” Coordinator/Supplier: Steve Barlock (Visible Light)

Maine Home +DESIGN

75 Market Street

Suite 203

207-772-3373

www.mainehomedesign.com

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