The Vermont log cabin is picturesque but poorly insulated.

Sue and Dave Priest dream of sustainability.

The Priests grow much of their own food—and brew their own beer—on BYB Farm. PHOTOS BY JOHN FABEL

The Direction of Their Dreams

A VERMONT COUPLE LIVES THE LIFE THEY HAVE IMAGINED.

"Go confidently in the direction of your dreams. Live the life you have imagined."

—HENRY DAVID THOREAU

MARY KRAUS

Sue and Dave Priest live a green lifestyle in a log house on 50 beautiful acres in North Chittenden, Vermont. Most of their food—including vegetables, eggs, maple syrup, bread, wine and beer—is produced at home. and they chop their own wood for heating. The couple's vehicles run on biodiesel sourced from local restaurants, and they also minimize car use by reducing commuting distance and days worked.

The couple balances full-time jobs with their farm work—Sue is an ophthalmic technician; Dave is an electrician. In their "spare time," they care for horses, chickens, cats, dogs and organic gardens on the farm, known as BYB Acres, which stands for "Break Your Back" or "Brew Your Beer," depending on their mood.

Although the Priests love the aesthetic of their 1987 log house, it falls short of their dreams for a sustainable home. Drafts of cold air stream in between missing chinks in the log walls, and the roof leaks. The rooms lack natural light, and the home's two-story layout isn't ideal (Sue's knee problems make climbing the stairs to the bedroom a challenge). Sue and Dave wonder which would leave a smaller ecological footprint: Working with the existing structure or leveling the cabin and building a straw bale home.

Previous efforts to CHINK CRACKS in the cabin still don't stop drafts.

The couple should replace the UNEVEN SUBFLOOR and intall green insulated flooring.

Dave collects used fry oil from restaurants and processes it in a BIODIESEL REFINER to make fuel for the farm vehicles.

PRIORITY #1
Get Ready for Winter

PROBLEMS: The building envelope is nowhere near weather-tight. Chinks have opened up between logs, so the air blows through, and previous chinking attempts have failed. Although the log walls are 8 inches thick, they provide a very low insulation value, about R-8 (R-19 is the standard; R-40 is very efficient). The roof insulation is minimal and damaged by rodents; there's no basement insulation. The windows, though double glazed, leak and lack the low-E coating that keeps heat in.

SOLUTIONS: Most important, the Priests should upgrade the insulation. To preserve the interior log-wall aesthetic, exterior insulation is best. The couple's idea is to wrap the home in straw bales, but this would require extending the foundation to support the bales.

A simpler solution is to use rigid insulation. Expanded polystyrene is a more environmentally benign material, but extruded polystyrene or rigid polyurethane has better insulation value. The wall section would have to be detailed to avoid condensation that might collect on the rigid boards. A user-friendly book on this topic is *Build Like a Pro: Insulate and Weatherize* by Bruce Harley (Taunton, 2002). They should also install new, insulated windows that are properly fitted to help retain heat.

COST: Installing 4-inch rigid polyurethane on exterior: $4.25 per square foot of wall area. Fiberglass and vapor barrier at roof: $2.50 per square foot of roof area.

PRIORITY #2
Refinish the Flooring

PROBLEMS: The carpet-covered entry area traps mud and moisture from outdoors, and the vinyl kitchen floor is cold and worn. The existing plank subfloor is uneven and full of gaps, posing potential challenges for finish flooring.

SOLUTIONS: To keep the kitchen floor comfortably warm, the Priests could add insulation between the first floor and the basement. Installing in-floor radiant heat is also an option.

To repair the subfloor, the Priests should choose FSC-certified, low-formaldehyde plywood and a green flooring option such as local reclaimed hardwood, cork or natural linoleum.

COST: Under-floor fiberglass insulation over basement: $1.75 per square foot of floor area. Radiant heat for first floor: $4.75 per square foot. FSC-certified wood flooring: $8 to $10 per square foot; cork: $9 per square foot; natural linoleum: $5.50 per square foot.

PRIORITY #3
Go Off the Grid

PROBLEM: Although their energy sources are good, they fall short of the Priests' dream of 100 percent sustainable energy.

SOLUTION: Sue and Dave make good use of wood from their property, using it to heat hot water and to stoke the outdoor, wood-burning furnace that provides backup heat for the house and garage. They use homemade biodiesel, which also runs their farm trucks, in their oil furnace. It required no furnace conversions, and they saved enough on gas last winter to nearly pay off the biodiesel processing equipment.

Through their local utility, the Priests have signed up for "cow power" electricity, fueled by methane collected by fermenting the manure of local cows. In addition, they hope to install micro-hydro, small-scale electricity generation using water power from a brook on their property.

COST: FuelMeister biodiesel processor equipment: $3,800. Micro-hydro system: TK.

The rustic plank ceilings are charming, but they MAKE ROOMS DARK.

PRIORITY #4
Lighten Up the Living Area

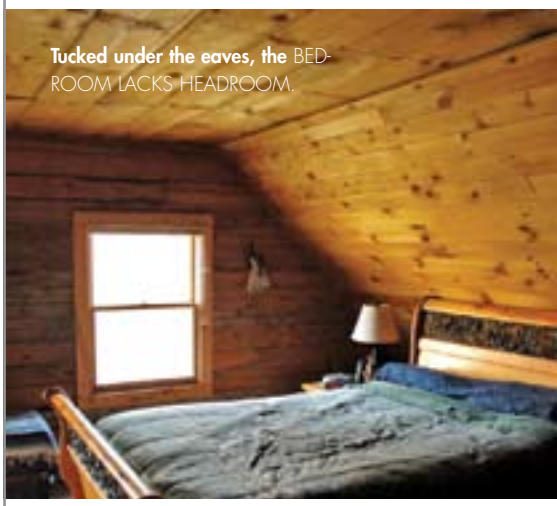
PROBLEMS: Exposed wood and inadequate lighting make the low-ceiling living and dining rooms dark.

SOLUTIONS: Because upstairs space is a low priority for the Priests, they could create a cathedral ceiling over the living room by eliminating the master bedroom above. (They would, however, have to add on a first-floor bedroom in this scenario.) With skylights, this raised ceiling would lighten the living area and make it more spacious.

A far less expensive solution would be to finish the existing wood ceiling with white paint. They could install track lighting along the edge of the wood beams, integrating with the ceiling patterns and providing much-needed brightness.

COST: Low-VOC white paint for beams and planks: $2 per square foot. Two rows of track lighting: $1,200. Removing ceiling and upstairs floor system to create cathedral ceiling: $8,000.

CAN THIS HOME BE GREENED?



Tucked under the eaves, the BEDROOM LACKS HEADROOM.

PRIORITY #5

Revise the Floor Plan

PROBLEMS: The cabin's floor plan has a number of faults: The dining room is cut off from the kitchen, the upstairs ceilings are so low that Dave bumps them with his arms when pulling on a shirt, the stairs are too steep, there's little storage and the design doesn't take advantage of the view to the north.

SOLUTIONS: Part of the wall between the kitchen and dining room could be opened for visual connection, and revamping the kitchen layout would improve this also.

The roof leaks and needs repair, so now might be a good time to raise it, providing more second-floor headroom and more floor space for closets. A standing seam metal roof would be best because it's durable and won't leak. More headroom might also allow for stair relocation, permitting a gentler slope and providing more openness in the overall floor plan (the current stair is central).

Because the view is north of the house, locating windows on that side would lessen energy efficiency. Adding a north-facing porch, however, would create a lovely outdoor place to sit and appreciate the view.

COST: Removing wall between kitchen and dining room plus kitchen remodel with modest wood cabinets: $2,500. Metal roof: price varies widely depending on roof's geometry. Recycled-plastic composite decking: $45 per square foot.

Start Over from Scratch?

Even if the cabin's layout were changed, the Priests would ultimately prefer one-level living because of Sue's knee problems and Dave's bad back. They could renovate it to suit their needs by adding a bedroom and guest room downstairs; however, the upstairs rooms would then go unused, which is a waste of space.

It usually makes "green" sense to work with what's already here, but this may be a case in which it's more appropriate to start from scratch and move the existing frame to another site. It would be a very nice house for someone whose lifestyle suits its layout. Moving the log house would make way for the Priests' straw bale dream house. NH

CAN YOUR HOME BE GREENED?

Send us information on your home and what you'd like to accomplish in it. You could be the recipient of a visit from one of our eco-experts. To submit your home or get more information, contact NaturalHome@NaturalHomeMagazine.com or write Can This Home Be Greened?, 1503 SW 42nd St., Topeka, KS 66609-1265.

Rx FOR YOUR HOUSE {bring the wisdom home}

TIGHTEN LEAKS AND INSULATE: Air leakage often accounts for a significant portion of energy inefficiency. First identify your home's insulation level and air tightness with an energy audit. Get good professional guidance so you don't create new problems such as condensation or appliance backdrafts.

FIND GREEN SOURCES OF ELECTRICITY: Contact your local utility and research your options for green electricity, whether generated by cows, wind or the sun's rays. If you have a south-facing roof, consider installing photovoltaic panels.

RAISE THE ROOF: If you have too many low ceilings, add dormers. If your existing roof is substandard, raising it while replacing it may be a viable option.

RESOURCES

COW POWER
(800) 649-2877
www.CVPS.com/cowpower
Vermont's green electricity program

ENGLERT
www.EnglertInc.com
metal roofing

GREEN POWER NETWORK
www.EERE.Energy.gov/greenpower
clean electricity options by state

HOME ENERGY AUDITS
www.EERE.Energy.gov
energy audit information

ENERGY STAR
www.EnergyStar.gov
(click on "home improvement")
energy improvement information

NEW ENGLAND BIODIESEL
(774) 696-2343
http://NewEnglandBiodiesel.net
FuelMeister biodiesel equipment