

# TEN WAYS TO TURN your old building green

BY VIRGINIA WRIGHT

**C**OMMUNITIES IN MAINE and across the country are witnessing exciting developments in sustainable design and construction. More and more structures are being built “green” with renewable or recycled materials, nontoxic paints and finishes, and, of course, energy efficient technologies like solar panels and super-insulation.

The attention given to these creative new designs is well deserved, but property owners who want to do the right thing for the environment should not be in a hurry to sell their old buildings and build new high-performance ones.

“Any new building, no matter how much green technology it incorporates, represents a new impact on the environment,” says Richard Moe, president of the National Trust for Historic Preservation, in a recent issue of *Preservation* magazine. The Trust’s Sustainability Initiative aims to educate people about preservation’s role in fostering sustainable development. “An older building represents a heavy prior investment of resources and energy. If you tear that building down, that investment is wasted—but if you keep the building in use, you’re saving energy and conserving resources. That’s what people mean when they call preservation the ultimate recycling.”

Historic and other old buildings can be made even more eco-friendly, but it’s important to understand that they have special needs. “One of the constant battles in historic preservation is that every time a new technology is invented or brought to market, everyone wants to try it,” says Nancy Barba of Barba Architecture and Preservation. “It becomes a prescription rather than something that needs to be carefully looked at for each situation. With historic buildings, we look for ways to balance these products with the inherent properties of the building. Often these technologies are not adaptive to historic construction.”

To find out what works and what doesn’t, we sought the advice of three building professionals: Barba, who has developed a slide-illustration presentation called *Sustainable Preservation*;



**Porches are not just places to spend a balmy day. Our ancestors knew that a well-paced porch helps keeps a house cool in summer.**

Peter Taggart, owner of Taggart Construction and chairman of the Maine chapter of the U.S. Green Building Council; and Danuta Drozdowicz of Context Green, a green building consulting firm.

### **1. Become an energy detective.**

Get a home energy audit before you make any energy updates to an existing building. “You will get a detailed report that shows where your heat dollars are going so you can make an informed decision about where to make updates,” Taggart says.

An auditor’s tools include a blower door, which is a calibrated fan that sucks air out of building. The auditor then measures how quickly outside air infiltrates the structure. He or she may use a smoke pencil to pinpoint unsealed cracks and openings. Other equipment that may be employed are an infrared camera to detect hot spots – places where heat is leaving the building – furnace efficiency meters and surface thermometers.

### **2. Seal cracks, gaps and holes.**

More building heat – as much as 50 percent in an older homes – is lost through convection, the movement of warm air through cracks and gaps to the outdoors or attic, than by either thermal or radiant heat loss. “There is a tremendous opportunity to reduce heat loss by reducing air leakage,” Drozdowicz says.

Some of these gaps are easy to find. You might, for example, see daylight around the sills in the basement. Others take a little more work to detect. “Often we find warm air leaking outside where two joints come together because they are not sealed perfectly,” Drozdowicz says. “We see lots of leaks into the attic. There may be gaps around the chimney or, if you have an interior partition wall with an electric outlet, warm air gets in and shoots right up into the attic.”

In the attic, seal chimney gaps with metal flashing or other noncombustible material. Caulking cardboard into place is a quick, cheap fix at the top of a partition wall. Foam insulation is more effective than fiberglass at stopping leaks through cracks and gaps.

### **3. Update heating and ventilation systems.**

Improving a building’s mechanical systems can often reduce energy consumption more effectively than adding wall insulation, which requires opening the wall or siding, damaging the historic fabric. “Demolition is costly and all that material ends up in a landfill, so there’s a sustainability issue as well,” Barba says. “Improving the mechanical systems is a lot easier. In some ways, it’s a no-brainer.”

Barba tells of a client who wanted to add insulation to the walls of an old school building.

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“It would have involved taking out all the plaster and rebuilding new walls with drywall,” she says. “All the historic trim and plaster would have been lost. We did some modeling and found that improving the mechanical systems alone would make a big difference. A heat recovery system, which recycles, filters and reheats already warmed air, ended up performing better than insulating the building would have.”

A boiler or furnace that is more than 15 years old is a likely candidate for replacement. “With the price of oil going up, there is a good chance of payback within eight to ten years,” Taggart says.

### **4. Insulate up and down, not all around.**

It is difficult to install wall insulation in wood-frame buildings without damaging some of its historic elements. That, along with the risk of moisture problems, leads many preservation professionals to recommend against it. “Blowing in wall insulation isn’t the first thing we would do,” Taggart says. “It depends on the house and what the relevant historic features are. If you’re already opening up the walls or putting on new siding or trim, wall insulation can be a good thing. We prefer dense pack cellulose blown in under pressure behind a vapor barrier.” The vapor barrier is crucial to protecting the building envelope from moisture, but it can be as simple as a latex paint finish.

Barba, too, says, “I would advocate for walls being the last place to insulate. It’s tricky, and it’s expensive if done well. Some types of insulation won’t cover the area well, and some have a tendency to settle, get moist and cause rot.”

Better to start with insulation in the attic – heat rises, after all – and in the basement whose above-grade masonry walls wicks cold air into the house. Barba recommends a blanket of curtain wall insulation along the basement’s inside perimeter.

“One of the major tenets is insulate and ventilate,” Barba adds. “You’ve got to do both. Keep moisture out. Make sure the roof is solid and not leaking. Install state-of-the-art fans in kitchens and bathrooms.”

### **5. Maintain and repair windows; don’t replace them.**

The Sirens of the vinyl replacement window industry continue to entice with promises of lower heating bills, but those inexpensive replacements seldom perform better than well-maintained originals with storms, and the payback in energy savings may take as long as forty years, if it happens at all. Vinyl windows have a life span of just 15-20 years compared to more than 100 years for well-maintained wood windows. Moreover, with their limited sizes, pane configurations and colors, vinyl replacements

almost always look out of place on an old home, and they never match the originals’ handcrafted details.

If it’s 20 degrees outside and 70 degrees indoors, yet you feel cold sitting next to a window, you’re experiencing radiant heat loss, when energy seeks colder objects to warm. “You can be surrounded by warm air, but still feel cold,” Drozdowicz says. “That’s one reason why people think replacing windows will make them feel more comfortable. It might, but the fuel bill isn’t going to go down because it is not the chief source of heat loss in the home. They might be able to achieve that same comfort less expensively with interior or exterior storm windows, curtains or shades.”

Truly drafty windows, identified by their tell-tale rattling, can be repaired by window restorers or homeowners with handyman skills. Remove the windows and apply integral weatherstripping to the edges. Reinstalled, the windows will have a nice, tight seal and, combined with close-fitting storm windows, they will be as energy efficient as vinyl systems with insulated glass – and cheaper in the long run.

### **6. Unplug appliances at night.**

“Electricity is one of the most expensive energies we use,” Taggart says. “When looking for ways to reduce electricity consumption, many people don’t realize there are ghost loads – appliances that they think they’ve shut off but which are actually still being used. Any appliance with a remote control or a clock has a ghost load.” Some examples include televisions, microwave ovens, stereos and computers. “Those things can add up,” Taggart says.

Cut electricity consumption by unplugging each appliance when not in use. Plugging several into a power strip can streamline the shut down/start up process.

Want to know which appliances are costing you the most? Taggart recommends purchasing a Kill A Watt. This small device can be connected to any appliance – microwave, television, washer – to measure its consumption by the kilowatt hour. “Like the energy audit, it gives you real data,” he says. Since the Kill A Watt is not something you will use repeatedly, be green about it too. “It’s a good thing to share with a neighbor,” Taggart suggests.

You can also conserve electricity by using compact florescent light bulbs and appliances bearing the Energy Star label.

### **7. Use water-conserving appliances, faucets and fixtures.**

Next to warming the house, heating water represents the biggest chunk of the home heating budget. Savings can be realized with tankless water heaters, which warm water instantly as needed, a

big improvement over traditional water tanks that work continuously to keep their contents warm. Solar thermal water heaters may be an option if the panels can be installed in a way that does not detract from the home’s historic profile.

Some preservation advocates frown on replacing vintage plumbing fixtures, though low-flow replicas are available. Replacements always make sense, however, if the originals are long gone.

Green practices encourage water conservation in general, not just for energy savings. Rainwater catchment systems can supply water for toilets and other appliances and irrigating gardens. “Reducing water use helps with your water bill and sewage bill, as well,” Barba points out. “Or, if your house is not on the sewer line, it can increase the life of your septic system.”

In the garden, plant only native and adaptive drought-resistant plants. “Invasive species threaten our environment by wiping out native species, but green landscaping, which is concerned with getting rid of invasive species and encouraging native and adaptive ones, fits into an historical context,” Barba says.

### **8. Choose locally produced and recycled materials.**

When planning that addition or renovation, use locally produced wood, granite and other materials, a practice that both minimizes energy and resources in transportation and is historically authentic, Drozdowicz says.

“And look for the historic elements you need at an architectural salvage store,” she suggests. “They will best suit an historic renovation and they’re certainly better than using virgin material.”

### **9. Don’t forget indoor air quality.**

Kitchen and bathroom exhaust fans that vent directly outdoors not only help alleviate moisture, but also ensure that the indoor air is fresh, clean and healthy. Heat recovery systems also use fans to bring fresh outdoor air into the house.

Other tips for better air: If you use a furnace with an air distribution system instead of a boiler, make sure you use high quality filters and change them regularly. Finally, select low- or zero-VOC (volatile organic compound) paints and finishes.

### **10. Do like our ancestors did.**

Many historic buildings have effective energy saving systems that are so simple that today’s owners fail to recognize their value. These include shutters and storm doors, vestibules which act as air locks, awnings and porches that block the summer sun, and deciduous trees that shade the house in summer, but let in the sun in winter. Says Barba, “A lot of green is going back to the way we used to do things.” ■