Three Steps to Super-Efficient Windows

Thinking of replacing your windows? You're not alone. Many homeowners are concerned about the efficiency (or lack thereof) of their windows. As Barbara Campagna of the National Trust for Historic Preservation says, "You're sitting next to a window, and you're feeling cold, and your energy bills are high." Windows are an easy-to-identify culprit.

The windows in many homes are candidates for repair or restoration—which saves resources and can save money over replacement.

Many homes built before the 1980s have single-paned wood windows, which can be repaired to seal as tightly as new vinyl, aluminum, or wood ones. If your home has vinyl or aluminum windows, these can't be repaired or restored, because they are all one piece. You'll need to replace them entirely if they're leaky—although you can try adding a storm window first. (See "Step Three" for details.)

Here's a step-by-step guide to energy-efficient windows:

what?

Repair or restore your wood-framed windows instead of replacing them.

why?

Save money over buying new windows, and potentially reduce your energy bill. Add decades to the life of your windows.

wow!

Save resources by restoring your existing windows. Save energy and cut down on your household global warming emissions.

The Case for Repairs

Heat loss through windows actually represents a modest (10 to 20 percent) portion of a house's energy leaks. If you have a limited amount to spend, adding insulation and sealing up major air leaks in the basement and ductwork should come before windows, says Jim Conlon of Elysian Energy.

But 10 to 20 percent is significant to your energy bill and carbon emissions, and drafts can affect your comfort. If you're ready to do something about your windows, the first step is to understand what makes a window efficient, or not.

Most of the heat lost through windows is lost through drafts (air leaks), not through the pane of glass itself. Heat loss happens between the glass and the non-glass frame. Old wood windows can be repaired to seal as tightly as new ones. If they were made before 1940, they are likely made with old-growth heartwood, which has a much higher insulating value than vinyl, aluminum, or even new wood.

Old wood windows can last another 100 years or more with proper maintenance. Modern replacement windows, on the other hand, only last 15 to 20 years. Most replacement windows rely on a double pane of glass for efficiency, and if sealant around their double panes fails, the whole window has to be replaced. In addition, they are usually made from vinyl, a toxic substance to produce and dispose of.

If you're not planning on window replacements, what do you do about your old, drafty windows? There are three major steps. ...

Step One: Repair or Restore

Cold air leaks in your windows from cracked panes, disintegrating glazing (the putty that holds the glass onto the frame), cracks in the frame, or drafts where the window doesn't close properly. If your windows have been well-maintained, but have a few problems, such as a cracked pane or some crumbling glazing, you can probably get a lot of mileage out of a few targeted repairs. But if your windows are sticking, don't shut tightly, or have years of deferred maintenance, a full restoration can make them weather-tight and weather-hardy.

In general, a full restoration should include: window removal, all paint stripped off, all cracks and rot addressed with epoxy or new wood, new sash cords (if needed), lock repair (if needed), reglazing, new glass if any is cracked, repainting, and reinstallation with an eye to tight fits and reduced drafts. Some paints and epoxies contain harmful chemicals, so search the "Paints" and "Construction—Materials" categories of Green America's GreenPages.org for less-toxic alternatives, and talk to your contractor about them.

If your window just needs a few repairs, many are easy enough for a DIY-inclined homeowner. Historic HomeWorks (www.historichomeworks.com) sells a report with detailed instructions for every step of the process, or search at www.preservationnation.org for "wood windows" to get the National Trust's tip sheet.

Consider hiring contractors with historic preservation experience, even if your home isn't in a historic district—they are more likely not to pressure you to replace your windows instead. Contact your local historic preservation organization (www.preservationnation.org/about-us/partners/statewide-local-partners) for a list of recommended contractors. Be aware that the restoration process will be slower than simply replacing windows.

Please note that as soon as you say "historic preservation," many people will warn you that your costs are going to skyrocket. But in fact, many homeowners find that when comparing

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the costs of window restoration and decent-quality replacement windows, restoration is often more affordable. Replacement windows can run anywhere from $200–$1,000 per window before labor costs, while window restoration generally ranges somewhere between $300–$400 per window, including labor. And that's not even counting the fact that restoration lasts much longer. A full restoration will add 50 to 100 years to your window's life, with minimal maintenance (such as painting every 15 to 20 years).

Step Two: Weatherstrip

To go that extra mile, or if your window is very drafty, weatherstripping—or adding strips of insulating materials to gaps in the window to seal air leaks—can make your window super tight. Since all types of weatherstripping are best installed when the window has been taken apart, it's a good idea to combine weatherstripping with repair and restoration work.

Your local hardware store will carry most types of weatherstripping, or contact Architectural Resource Center (www.aresource.com) or blackEnergy (www.blackenergy.com).

There are three separate places to consider weatherstripping in a window:

First, consider the top and bottom, where the sashes (the framed pieces of glass that move) meet the rails (or sills). You can get some benefit from weatherstripping here with a sticky-backed foam, but pros recommend a silicone and rubber gasket that conforms to the irregularities of your window.

Second, look at the spaces between the jambs, or the vertical surfaces that the window slides along. Pros recommend a strip of "spring bronze" that can be bent to cover any gaps here.

Finally, there's the place in the middle where the upper and lower sashes meet. What you use here depends on how much of gap you have—more spring bronze might do it, or for bigger gaps of several millimeters, putting two interlocking, U-shaped metal pieces that meet on the sides of the sash can seal out drafts.

Step Three: Get a Storm Window

You don't need a replacement window to get a double-pane effect and seal off drafts. All you need is a storm window, which is about one-sixth to one-eighth of the cost. In fact, just adding a high-quality storm, without changing the existing window at all, has an energy savings payback time of only 4.5 years, compared to 40.5 years for a regular replacement window, and 240 years for a low-e glass window. If your leaks seem minor, a storm window by itself may be all you need. If your window has been restored, a storm window will still double the r-value (resistance to heat flow), and an external one will protect your window from the weather.

There are four major types of storm window:

- **INTERIOR ACRYLIC PANEL, WITH A MAGNETIC SEAL:** Acrylic (the most common brand is Plexiglas) is a better insulator than glass and is lighter weight. With these systems, a homeowner installs a small steel track around the indoor side of the window frame, and a magnetic frame around the outside of an acrylic panel. The acrylic panel snaps in place on the track with an airtight seal. These kits are sold by retailers such as Magnetite (www.magnetitewindows.com) and Window Saver Company (www.windowsaver.com).
- **INTERIOR "INSULATED PANEL":** These windows are basically a double layer of clear plastic film with an insulating layer of air between the plastic panels, in a plastic frame. They fit snugly into the indoor side of the window frame and are held in place with small hardware. They may not fit in all window frames. You can find them at a store like Advanced Energy Panels (www.windotherm.com).
- **EXTERIOR, TRIPLE-TRACK ALUMINUM:** This has been the traditional storm window for decades, and they are easily available. Installed permanently on the outside of the window, they are made of two panels of glass—the bottom panel slides up, with a screen you can lower in its place.
- **EXTERIOR, WOOD:** The traditional wood-framed storm window is enjoying a comeback both for durability and aesthetics. Choosing acrylic panes improves their insulating power. These storm windows do have to be removed and reinstalled from the outside at the change of seasons. Local craftspeople or contractors can custom-build them to each window, or you can order them from places like GreenWood WorkShop (www.greenwoodworkshop.com).

Save Energy, Save Money

Jennifer Quinn, who owns a historic house in downtown Albany, NY, recently had all her windows restored and added interior storms. She spent less on the restoration than she would have on replacements, and she's thrilled with the results: "They were leaking, rotting, some of them stuck, others wouldn't stay open. Now they all open with one hand and close with one hand. Now we know for sure we have no lead paint. We have no more drafts. And I know we're doing the right thing for the environment." Best of all, the Quinns' restored windows have also insulated them from rising energy costs.

—Miriam Axel-Lute

Lead Paint and Old Windows

Old windows are very likely to have lead paint on them. Before you have any window repairs done, educate yourself thoroughly about lead paint safety. Lead dust from renovations is a leading cause of lead poisoning. If you have lead paint in bad condition on your windows and children in the house, at a minimum you need to remove flaking paint and repaint. See the Web site of the US Dept. of Housing and Urban Development for lead-paint safety guidelines: www.hud.gov/offices/lead/library/lead/LeadGuide_Eng.pdf.

Quick Fixes

If you have drafty windows now, here are three quick things you can do before you get around to repairing them:

- Lock them. Window locks force the windows to close more tightly and reduce drafts significantly.
- Block drafts. Place a rolled-up towel, or leg of old pantyhose filled with rice, on the sill, and also in the middle where the two sashes meet.
- Hang insulating blinds or drapes, and close them at night.