

Replacing Your Windows? Don't Believe The Hype

With energy costs rising, everyone is thinking of how to make their houses, offices, churches, and other buildings more energy efficient. And all you have to do is go into your hardware store, turn on the radio or television, or look in the paper, and you are bombarded by people encouraging you to replace your windows. "You'll reduce your heating bills by up to 30 percent," some claim. Before you get out your credit card, please consider three things:

1. The removal of historic windows can greatly diminish the historic character of a building.
2. Replacing windows alone in an old building may not save much money, and you may not recoup the cost of the windows.
3. You have many other options that are more cost-effective for improving the energy efficiency of your building.

Windows are the "eyes" of your building's "face." Replacing them with new units that do not reflect the style, materials, or color of your building can greatly diminish its historic character. The worst offenders are those white, vinyl windows available at local home centers. The loss of historic fabric is a real problem in Chester County. Demolitions are one thing, but everywhere folks ripping out windows, removing or covering cornices, taking down shutters, covering their wood siding, and sometimes brickwork, with vinyl siding, and other measures. Their goals are to reduce maintenance and to their minds to improve their energy efficiency. What many people seem to forget is that proper maintenance and repairs are investments in their buildings. Removing features and making unsympathetic changes can reduce the value of an historic building, and in most cases, there are plenty of alternatives to the removal of historic fabric.

Claims of energy efficiency for windows focus on the U-value, and its inverse, the R-value—which I'll use here since you may be familiar with R-value in insulation—and resistance to air infiltration. Old windows have an R-value of nearly zero, and they are very drafty. New windows, especially the most expensive, are much more air-tight and have up to four-times the R-value as old windows, which sounds pretty good until you look at the R-value and draftiness of the rest of your building.

Almost every building constructed before the 1900s was built with no insulation. If your building has been retrofitted with insulation, then the following discussion pertains less to you.

Without insulation, you can't retain heat. R-value is the measure of a material's resistance to the transfer of heat from one side of the material to the other. Glass, wood, brick, and stone all have an R-value of about 1. For a one-foot-thick masonry wall of stone, the R-value is 1.5, and with greater thickness comes a higher R-value, but not by much. An 18-inch-thick stone wall, which is typical in Chester County, may only have an effective R-value of 2.25. (Masonry walls have thermal mass, which is the ability to gain heat and release it slowly, and while this property is advantageous, it is not the same thing as resistance to heat loss.) Most of the super-efficient, and expensive, new windows have an R-value of about 4 to 5. So, if you have an 18-inch-thick masonry wall with an R-value of 2.25 and 30 percent of your wall area is window, then by installing these new windows, you may only increase the overall R-value of the wall to 2.9. If you have no insulation in the attic, where most of the heat leaves the building, then the expense of those windows may not reduce your heating bills at all.

The main reason old windows are energy losers is the air leakage. You can stop the flow of air around the windows at far less expense by installing weather-stripping and storm windows, which is the recommendation of the National Park Service, the federal agency that sets preservation policies, standards, and guidelines. If you don't like the look of exterior storm windows, and who does, you may want to consider interior storms, which have no negative impact on the exterior appearance of the building, and are often better at resisting air infiltration. Storm windows also improve the overall R-value of the windows. Thus, for less than half the cost of the energy-efficient replacement windows you can get much of the same benefits, and you've kept your historic windows intact.

For cost-effective energy efficiency you can't beat sealing the house and insulating it. The EPA's Energy Star program strongly recommends this approach. Caulk around every window and door, every juncture between materials, such as where the pipe to your fuel-oil tank passes through your exterior wall, and every other place where air can easily flow into and out of

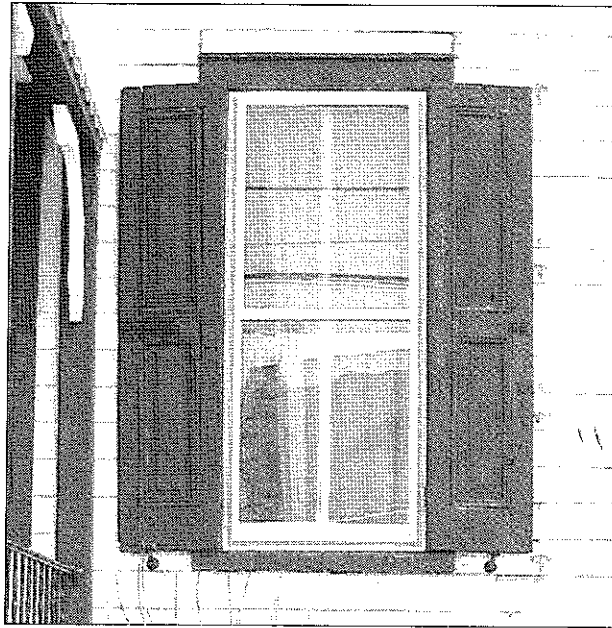
your building. Install weatherstripping around your windows and doors. I recommend metal weatherstripping because it will last. Vinyl and foam strips are not that durable.

Energy Star recommends installing enough insulation in your attic to achieve an R-value of 30, which is a far cry from the R-4 you get with new windows. I should mention that Energy Star does recommend that you replace your windows, but their recommendations are for houses with insulation. In fact, most contemporary recommendations for improving energy efficiency are based on the assumption that your building was constructed in the last 30 years because more than half of all buildings in America were.

You have many options for insulating your attic. One of the most effective is to have it blown in, using either fiberglass or cellulose (ground-up newspapers or fabric). This fills all of the nooks and crannies for a tight fit. If you want to be able to use your attic, you can insulate the rafters. To do this you'll need to install vents between the insulation and the roof. Another option is to have the entire floor laid with multiple layers of rigid insulation. You'll need to caulk the joints between the panels. By laying plywood on top of that you'll have a durable surface for walking on and for storage. Another alternative is having bio-foam insulation sprayed onto the underside of your roof between your rafters. This may be the best at increasing R-value with the least amount of material, but it permanently affixes to your woodwork, which is not a good idea for historic buildings.

One recommendation made by PECO, Energy Star and others that definitely pays for itself is to have an energy audit performed on your building. You'll get recommendations that are specific to the needs of your building that run the gamut from heating and air conditions to electricity use, and some look at plumbing systems. To find an auditor in your area, do a web search on "energy auditors Chester County".

One more item: I have heard many say that they want to replace their windows to reduce maintenance because cleaning and painting old windows is difficult and expensive. In my experience, claims of "zero



Storm windows can improve the efficiency of a window for less than the cost of replacing them, increasing R-value and reducing air infiltration.

maintenance" are bogus. Everything needs maintenance. Yes, painting windows can be expensive, but it is less expensive than replacing them and a good paint job can last as long as the new windows, depending on the quality of the windows. New windows are surprisingly delicate. The seals will breakdown, the argon gas will leak out, and the thin vinyl gaskets will fail. The result is a window that may look fine, but is not doing what you bought it to do, plus it may be leaking rain into your walls rotting framing and siding which you cannot see underneath. A new window may have a great warranty, but the manufacturers may not pay for the labor for

the installation of the second set of replacement windows or for damage incurred to the building resulting from a problem with the window.

As for cleaning, if you opt for exterior storm windows, which are easy to clean because the sash can be taken inside, plus the storm windows, themselves, can help keep the historic windows clean and in good repair.

If you'd like more information, please feel free to contact me at 610-620-4656, or check out:

Energy Star program, www.energystar.gov

Old House Journal online has many articles on improving the energy efficiency of old buildings. Go to www.oldhousejournal.com and do an article search for "energy"

Whole Building Design also has a good article on Sustainable Historic Preservation: www.wbdg.org/resources/sustainable_hp.php?r=sustainable

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