

Windows of Opportunity: Repair - Don't Replace - Those Older Wood Windows

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June 2009 (updated January 2013): When planning for CPA historic preservation projects, the discussion often includes: "What are we going to do about these old windows? Should we replace them or repair them?"

Repairing historic windows is more economical and environmental than you might think, and almost always the right choice. In this market-driven economy, we are constantly barraged with ways to buy our way to "go green." Each year, Americans demolish 200,000 buildings. That is 124 million tons of debris, or enough waste to construct a wall 30 feet high and 30 feet thick around the entire U.S. coastline.**[1]** Every window that goes into the dump is adding to this problem. Doesn't it make more sense to make good use of what we already have instead? Living in an existing house in an established neighborhood is already greener than building a new green house. That is not to say that older and historic homes can't be made even more efficient - they can. Likewise, refurbishing an existing historic window is a greener approach than installing a new one.**[2]**

Historic preservation is part of the solution to reducing our carbon footprint. But there are still many myths to bust, especially when it comes to windows. A growing body of research and professionals agree that weatherization and air sealing saves more energy - and hard-earned dollars - than replacing windows. Even the U.S. Energy Department agrees: "We have found weatherization to be a more cost-effective option in decreasing energy bills."**[3]**

So why is window replacement so popular? Windows are the easy mark. It can be tempting to replace windows because you can immediately see a difference. As one manager of a weatherization company said in response to the relatively low demand for air sealing as compared with window replacement, "I provide something that's invisible."**[4]**

Companies assert that their replacement windows will save the building owner time, money, and that it is the 'green' thing to do. But before any decisions are made about replacing historic wood windows, consider the benefits of retaining existing windows.

- **Wood windows made prior to the 1940s are likely made from old-growth wood.** This wood is significantly denser, durable, rot resistant, and dimensionally stable. New wood windows, while preferable to new vinyl or composite windows, still do not match the quality and durability of historic wood windows.
- **Historic windows were made specifically to fit their window openings and were custom installed.** Each one is probably a little bit different. Older windows may also have shifted and changed with their openings as the building aged. After 100 plus years, they may no longer be

exactly square, but they still fit the opening. New, theoretically square replacement windows installed in those not-perfectly square openings will leave drafty gaps. Compensating for discrepancies in the historic opening by furring it out results in a smaller window, less light, distorted proportions, and window trim that doesn't match the opening.

- **Traditional windows are made from individual parts. Each piece - the rails, stiles, muntins, stops, sill, stool, jamb - can be individually repaired or replaced in kind.** Vinyl, aluminum, fiberglass, and composite windows are manufactured as a unit and the components generally can not be repaired. When a part fails, when the insulated glass seal breaks, or when the vinyl warps, [5] the entire unit will need to be replaced.
- **Repairing and increasing the energy performance of existing wood windows is good for the local economy.** Hiring a window repair specialist to refurbish windows creates skilled local jobs. Finding someone to repair windows may be as close as the phone book. Additional leads in Massachusetts can be found at the [New England Window Restoration Alliance](#), [Historic HomeWorks](#), and the [Preservation Trades Network](#).
- **Adding weather stripping and an interior or exterior storm window to a historic wood window in good repair will significantly improve its energy efficiency and the occupants' comfort level without having to replace the entire unit. [6]**
- **Windows are an authentic part of a building** - they are a **character-defining feature**. Their size, placement, proportional relationship to the wall space, style, material, how light reflects off of them - all of these elements contribute to how a building looks and feels, as seen in the picture below.
- **Going green is more than just energy performance.** To determine the real environmental impacts, one must take into account the embodied energy of the existing windows and that of the new window, the environmental impacts of manufacturing new products, and the expected life-cycle of the product. Embodied energy includes the energy required to extract the raw materials, transport them, make them into a new product, ship the product and install it. Tearing out historic windows for replacement units not only wastes their embodied energy, it requires additional energy to remove and dispose them. This is on top of the energy required to create and install the new windows.
- **Read the fine print.** Many replacement windows also come with "Limited lifetime warranties." Even the better quality replacement windows limit the "lifetime" warranty on the glass to 20 years, installation to 2 years, and the non-glass components to 10 years. "Lifetime" better describes the lifetime of the product, not the lifetime of the building. Research that Donovan Rypkema has compiled indicates that 30% of the time, a replacement window will be replaced within 10 years. Even more revealing is the fine print that describes what is *not* covered by the limited warranty. And the warranties are only good if the company that issued them is still in business when you need to have the window replaced. Replacement windows are called "replacement" for a reason.
- **More fine print.** But they're guaranteed! Many window replacement companies promise that by installing their windows, 40% of heating or cooling costs will be saved, guaranteed. However, the fine print reveals that if that 40% is not saved the maximum total refund is \$500. So after spending thousands of dollars to replace the authentic historic windows the refund isn't even close to what was spent on the new windows.
- **Installing new windows is not going to pay for itself in energy savings.** For example, after spending about \$12,000 dollars on properly installed, high-quality replacement windows (the average home has between 24 and 30 windows, replaced at an average of \$500-\$1,000 each), a typical household might save about \$50 a month on heating or cooling bills. However,

if a house in Massachusetts is actively heated or cooled for an average of six months a year, that savings amounts to only \$300 a year. At this rate, it would take 40 years to even begin to recoup in energy savings the amount spent on the new windows.[7] By following some other no-cost and low-cost ways to improve a building's energy efficiency, that \$50 a month can easily be saved without an outlay of thousands of dollars.

- **Statistically, it is virtually impossible to recoup, in energy savings, the amount of money spent on replacing historic wood windows with new windows before the new windows need to be replaced.** The average person in the U.S. stays in the same house for between 5 and 7 years. When it takes upwards of 40 years to recoup in energy savings what was spent to replace the windows, the expense will never be recouped. Other studies have found that it can take as much as 222 years to recoup in energy savings what was spent on installing the replacement windows.[8] Furthermore, the typical replacement window often fails within about 20 years. So in the time it would take to recoup the original replacement windows, statistically, the replacement windows will already have had to be replaced at least once.

Easy, Low-Cost Window Energy Efficiency Tips

- Caulk around the window opening on the exterior
- Caulk around the window trim on the inside
- Add weather stripping to the window sash. There are many types of weather stripping to suit various window types, budgets, and needs. For help on selecting which kind to use, and how to apply it, talk with a window repair specialist, or visit websites such as the *Old House Journal* or Historic HomeWorks.
- Use interior or exterior storm windows or thermal panels [9]
- Make sure sash lock brings the sash together tightly
- Make sure of curtains and blinds to keep hot sun out in the summer and warm air in during the winter

Case study from an architect in Oklahoma

I worked with a neighborhood group in one of our communities who was rehabbing a house; not historic, but a very nice Victorian, with two large Queen Anne windows on the street. Nothing was wrong with the windows, but they wanted to improve the energy efficiency, and were going to replace them with 4 vinyl windows. The size of the opening required using two vinyl windows per opening. The cost of this was \$3,800.00 and would change the architectural character of the house. I brought a contractor in who was experienced in restoration and wood. His cost to repair the sash weights, refinish and weatherize was \$780.00. We added two custom storm wood windows for another \$800.00. HALF the cost of the vinyl replacements and the restored original windows will last another 100 years vs. the 14.2 years of the replacement windows and will perform every bit as energy efficient.

Further Resources...

>> "What Replacement Windows Can't Replace: The Real Cost of Removing Historic Windows." Sedovic, Walter and Jill Gotthelf. APT Bulletin: Journal of Preservation Technology, 36:4, 2005.

>> "The Right Thing: What are the facts and the myths of the replace vs. restore historic windows debate." Sedovic Walter, and Jill Gotthelf. *Traditional Building*. Special Report, Green Windows & Window Restoration. 159-160, 2008.

>> "**Strips and Storms: Techniques for tuning up sash windows for winter.**" Jordan, Steve. *Old House Journal*. November/December 2004, pp. 46-51.

>> [A Building History of Northern New England](#). Garvin, James L., University Press of New England, 2001, 211 pp. This book has an excellent section on wood windows, sash weights, and how to estimate the date of construction based on muntin (sticking) profile.

>> **“Measured winter performance of storm windows.”** Klems, Joseph H., (August 23, 2002). *Lawrence Berkeley National Laboratory*. Paper LBNL-51453.

>> **“The Repair of Historic Wooden Windows.”** Myers, John H., The National Park Service, *Preservation Brief Series # 9*

>> “Sash Window Secrets.” Old House Journal Technical Staff, *Old House Journal*, March/April 2006. 82-85.

>> *The information in this article is adapted from the forthcoming online weatherization guide from the **National Trust for Historic Preservation’s Sustainability Program**.*

[1] Hadley, James. “The Home of the Future?” [ArchitectureBoston](#) 10, No. 2 (March/April 2007): 44-47.

[2] You can also stream the session “Windows Repairs: a Green Alternative” from the March 2009 Traditional Building Exhibition and Conference, and access the presentation slides at: **<http://www.windowrestorationne.org/>**

[3] Gil Sperling, In: Wald, Matthew L., “Focus on Weatherization is Shift on Energy Costs.” *New York Times*. December 30, 2008.

[4] Tom Kenny, Manager of C&O Conservation In: Wald, Matthew L., “Focus on Weatherization is Shift on Energy Costs.” *New York Times*. December 30, 2008.

[5] For more on the environmental and health impacts associated with PVC, see Joe Thorton’s report, “Environmental Impacts of Polyvinyl Chloride Building Materials” available at **<http://www.healthybuilding.net/>**.

[6] See Sedovic, Walter and Jill Gotthelf. “What Replacement Windows Can’t Replace: The Real Cost of Removing Historic Windows.” *APT Bulletin: Journal of Preservation Technology*, 36:4, 2005;

Sedovic Walter, and Jill Gotthelf. “The Right Thing: What are the facts and the myths of the replace vs. restore historic windows debate.” *Traditional Building*. Special Report, Green Windows & Window Restoration. July 2008, 159-160.; Cluver, John H. “Still No Substitute.” *Period Homes*, 7:6, November 2006, 12-14.

[7] These figures assume that the windows are paid in cash or with zero percent financing. If the amount of interest paid on the total cost of the window replacement is added, the payback period will be even longer.

[8] e.g. Calculations by Keith Heberern **[available here](#)**.

[9] The Midcoast [Maine] Green Collaborative (**www.arttec.net/Thermal-Windows/index.html**) found that by installing insulating panels on windows, the average house in their service area would save 100 gallons of oil in the first year.

Source URL: <http://www.communitypreservation.org/windows>