

*Where are your heating dollars
really going?*

How to Weather-proof Your Historic Home *(Without Compromising its Character)*

Reports that home energy bills could rise from 30 to 100 percent this winter have sent homeowners scrambling to find ways to reduce energy costs. While perhaps more tempting than ever, window replacement is not the only option for historic homeowners. For those concerned about conserving energy without compromising the character of a historic home, we offer the following guide.

Windows: To Replace or Not to Replace?

Although window replacement is often the first option homeowners explore when hoping to curb energy costs,

preservation professionals generally frown upon the approach except in rare instances when the historic materials are deteriorated beyond repair. But, why? First, historic windows play a significant part in conveying the character of historic buildings. Windows provide clues about a building's age and style.

So if preservation professionals are principally concerned with a building's character, why do they recommend against replacing windows with new ones that look exactly like the old ones? Because historic windows also represent a level of craftsmanship and quality of materials that is difficult to achieve today.

The wood that was used to mill historic windows was old-growth wood from virgin forests – wood of a quality and density that is no longer available. As a tree grows older, its growth rings grow denser. Old-growth wood has up to thirty growth rings per inch. To be considered “antique,” newly harvested pines must only exceed six growth rings per inch. Whereas old-growth wood had a lifespan of hundreds of years, new growth wood windows are expected to last only twelve to fifteen years. Likewise, most vinyl window manufacturers offer a warranty of twenty to thirty years.

But the main reason preserva-



A tight-fitting exterior storm can increase the energy efficiency of your historic windows

Historic windows do not leak simply because they're old and need to be replaced; rather, they often leak because they need maintenance.

tion professionals are not keen on the idea of replacing historic windows to increase energy efficiency is that studies have shown that with inexpensive weatherization, historic windows can be just as energy-efficient as replacements. Because newer materials often have shorter lifespans than historic materials, it is important to consider replacement costs along with any energy cost savings. A recent non-scientific study found that it would take nearly seventy-five years for any cost savings achieved by purchasing new wood windows versus weatherizing historic windows. In other words, it takes seven times the average lifespan of replacement windows to recoup the cost of replacing them.

The potential loss of character and quality materials is a high price to pay for little or no gain in energy efficiency. Instead, we recommend these alternatives.

Passive Measures for Increasing Efficiency

In *Preservation Brief #3*, "Conserving Energy in Historic Buildings," the National Park Service recommends six passive measures for reducing energy costs. They are listed below, followed by the advice of the Kansas Historic Preservation Office.

Lower the thermostat in the winter, raise it in the summer.

Our advice: Energy gurus recommend that thermostats be turned down to 60 – 65 degrees in the winter and up to 80 degrees in the summer. Newer thermostats can be programmed to adjust the temperature throughout the day.

Control the temperature in those rooms actually used.

Our advice: We recommend closing off rooms not in use. Many historic

homeowners are maximizing their home's potential by retrofitting historic fireplaces with wood-burning or pellet-burning stove inserts with blowers.

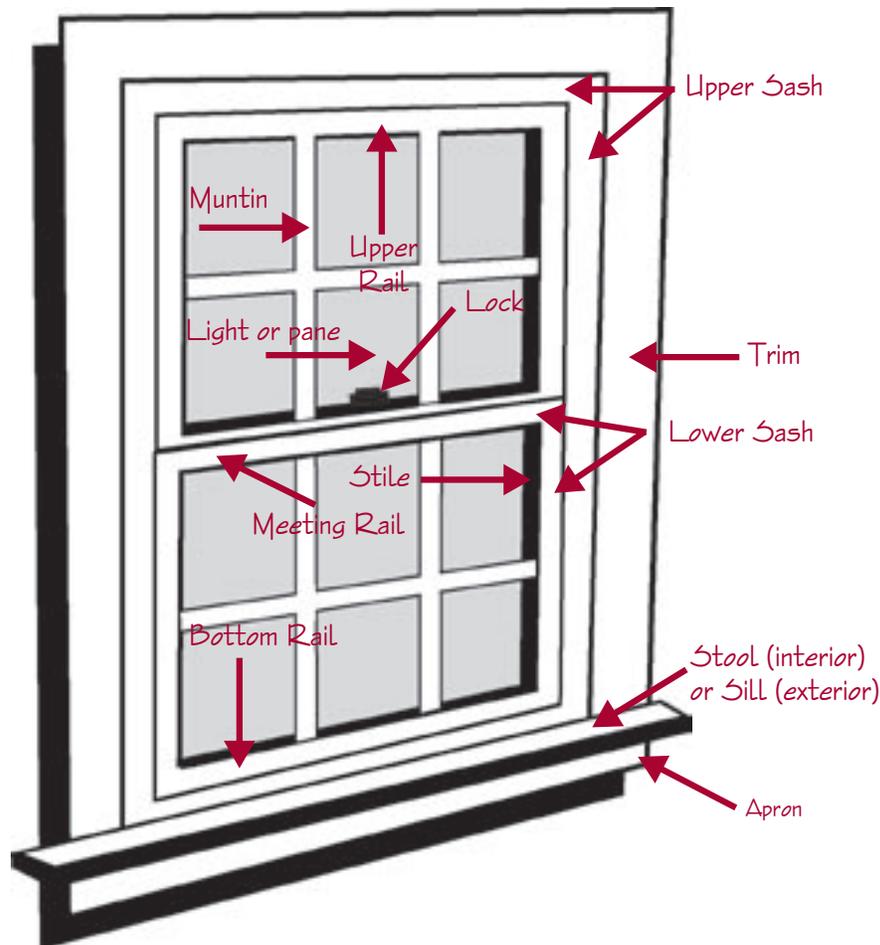
Reduce the level of illumination and number of lights (maximize natural light).

Our advice: We encourage the use of heavy drapes or insulated window treatments. Create your own using quilt batting and/or bedspread fabric—or go high-tech with insulating cellular window shades. Open curtains on south-facing windows on sunny days to take full advantage of natural light and heat.

Use operable windows, shutters, awnings, and vents as originally intended to control interior environment (maximize fresh air).

Our advice: This measure pertains mostly to the summer months. If you have an attic fan, learn to use it. Open

Most air infiltration occurs at joints, which should be periodically caulked and puttied.



The Anatomy of a Window

the house during cool nights and close it up during the day.

Have mechanical equipment serviced regularly to ensure maximum efficiency.

Our advice: One historic homeowner reports that his seventy-year-old furnace has an efficiency rating of 79 percent. The goal for new units is 80 percent. If properly maintained and in good working order, older units can come close to the levels of efficiency of new ones. That said, we have nothing against new units, which can offer more features for obtaining maximum energy efficiency; for instance, timed thermostats that automatically adjust the temperature based upon occupancy or activities.

Clean radiators and forced air register to ensure proper operation.

Our advice: Call a professional to clean and properly maintain these units.

Change filters regularly per manufacturers' recommendations.

According to the National Park Service, these measures can reduce energy consumption by as much as 30 percent.

Retrofitting Measures

Property owners can reduce energy consumption by an additional 20 to 30 percent by undertaking retrofitting measures.

Caulk and putty leaking windows.

Our advice: Historic windows do not leak simply because they're old and need to be replaced; rather, they often leak because they need maintenance. Caulk all exterior inoperable joints where materials like window frames and siding meet. The outdoor temperature must exceed 40° Fahrenheit when you caulk.

Caulking lasts between twenty and fifty years, but must be checked for cracking every few years. Glazing compound is used to seal joints between the glass on your windows and the wood pieces (sash or muntins) that hold them. When this fails, old compound or putty can be removed and replaced. A study of historic windows found that properly maintained historic sash (the moveable parts of the window) are just as efficient as new sash. To see a copy of the study, go to homeenergy.org/archive/hem.dis.anl.gov/eehem/97/970908.

Install interior or exterior storm windows.

Our advice: A study published in *Home Energy Magazine* compared the energy efficiency of various treatments to historic windows. The study found that the installation of properly fitting exterior storm windows over historic wood

Energy Saving Often Starts in the Attic



Attic fans can use natural ventilation to efficiently cool your home.



Cellulose insulation, made from recycled materials, is a good choice for insulating unoccupied attic space.



Louvers and vents help keep your attic properly ventilated so moisture does not cause deterioration.

The majority of heat loss in a historic building is through the attic and roof.

windows can result in increased energy efficiency similar to that of a replacement window. To see a copy of the study, go to homeenergy.org/archive/hem.dis.anl.gov/eehem/97/970908. Storm windows offer an energy-efficient reversible alternative to window or sash replacement. Aluminum or enameled metal storm windows are inexpensive options. For those concerned about appearance, wood storm windows are also an option. Contact your favorite contractor or go to traditional-building.com for a list of manufacturers.

Properly insulate your attic.

Our advice: The majority of heat loss in a historic building is through the attic and roof. We recommend rolled insulation or blown-in loose insulation like cellulose (environmentally friendly, loose/dry recycled newspaper treated with boric acid only). Expandable foam sprayed-in insulation can cause condensation, which can promote deterioration of historic fabric. If the attic is not occupied (heated/cooled), place a vapor barrier facing down. If it is occupied, place the vapor barrier up. It is important that an insulated attic be properly ventilated. Many historic homes have louvered vents or ridge vents for this purpose. It is important to retain these openings as they not only serve to keep insulation dry, but also allow hot air to escape in the summer.

Properly insulate your basement or crawl space.

Our advice: In an unheated/uncooled basement or crawl space, install rolled insulation along first-floor joints and place vapor barrier facing up. In heated basements, *Preservation Brief #3* recommends the following: "Begin the insulation within the first floor joists, and proceed down the wall to a point at least 3 feet below the exterior ground level if possible, with the vapor barrier facing



Weatherstripping keeps air from penetrating gaps around window and doors.



Chimneys can be a source of air leaks.

in.” There is also an advantage in insulating your water heater, often located in cool basements. Your hardware store will have kits for this purpose that cost approximately \$20.

Weatherstrip operable joints.

Our advice: Weatherstripping made of metal, vinyl, or foam has long been used to improve energy efficiency of doors and windows. Strips are installed between window sash and frames and between doors and doorjambes. This keeps air from penetrating gaps between architectural features. According to the California Energy Commission, sealing a home with proper weatherstripping

can result in an energy savings of 10 to 15 percent. Historic window sash can also be retrofitted to run along new sash tracks. For more information on weatherstripping, see consumerenergycenter.org/homeandwork/homes/tighten/weatherstrip. There is also a great step-by-step guide at thisoldhouse.com/toh/knowhow/managinghome/article/0,16417,1120083,00.

Check/repair chimneys and fireplaces.

If your fireplace is leaking cold air, your damper may be lodged open or broken. Contact a chimney specialist to have it repaired or sealed.

How Can I Gauge the Energy Efficiency of My Home?

Property owners can hire a professional to conduct an energy audit—or they can do it themselves with the help of online service such as the Lawrence Berkeley National Laboratories’ free energy audit. Simply go to hes.lbl.gov and enter information about your home, such as location, square footage, foundation type, number of windows, date of construction, and type of insulation. The tool will calculate expected energy costs for your property. If your energy costs far exceed the site’s calculations, you should call a professional.

To read Preservation Brief #3 in its entirety, go to cr.nps.gov/hps/tps/briefs/brief03.

For information on window repair, see Preservation Brief #9 at cr.nps.gov/hps/tps/briefs/brief09.