

Enhancing Energy Efficiency in Historic Buildings

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As the cost of energy rises, resource supplies become precious and the public becomes increasingly aware of environmental dangers associated with the burning of fossil fuels, home energy efficiency has become more than a fringe concern. Homeowners worldwide are currently enhancing their homes' energy efficiency, although owners of historic homes have met some unique challenges: How do you introduce new architectural elements into an old home without interfering with its original design? As luck would have it, this concern is somewhat balanced by energy-saving qualities already present in many historic homes that reduce the need for alterations. This article details the ways that historic homes are inherently energy-efficient, and offers ways that such assets can be further improved.



Historic buildings are often more energy-efficient than modern construction. In fact, studies have shown that buildings constructed before 1940 require less energy consumption for heating and cooling than houses built during the subsequent 35 years. Before electricity was available, homes capitalized on natural sources of lighting, heating and ventilation because the house itself – not electric lights and heaters – was all that protected occupants from the elements. Some specific elements of older buildings that contribute to their excellent energy efficiency are as follows:

- thick, heat-retaining masonry walls made from stone or brick;
- exterior balconies, porches, wide roof overhangs, rooftop ventilators, clerestories, skylights, awnings and shade trees were all used in homes built in warmer climates;
- windows often include exterior shutters, interior Venetian blinds, curtains and drapes which make them more energy-efficient than modern windows;
- exterior walls were often painted light colors to reflect the hot summer sun, resulting in cooler interior living spaces; and
- windows were only installed where they could



effectively allow for lighting and ventilation. Modern architecture, by contrast, relies on more windows than are necessary as a stylistic measure, with a reduced R-value as an unfortunate side effect.

Retrofit dangers to avoid in historic buildings:

- avoid waterproofing old masonry. Waterproof coatings will trap moisture against the masonry, potentially causing deterioration during the freezing cycle;
- damage to or removal of historic architectural elements. Replacing solid, historic materials or components, such as natural wood with substitutes made of plywood or plastics, have short lifespans under certain conditions;
- exposing occupants to toxins, such as lead dust and asbestos. Older homes were built before much was known about the health effects of certain chemicals, some of which might become airborne during the retrofit process. Be sure to ask your InterNACHI inspector about concerns during your next inspection;
- introducing materials that may damage existing components. Certain cellulose insulation uses ammonium or aluminum sulfate as a fire retardant, which may react with moisture in the air to form sulfuric acid and damage metals (including plumbing and wiring), building stones, brick and wood; and
- retrofits that violate rules imposed by committees overseeing historic districts. In some areas, even exterior paint color must be approved.
- removing historic windows and other components, adding aluminum siding, or installing dropped ceilings in interior spaces.

Retrofits in Historic Buildings

The following retrofits are often used in historic buildings to make them more energy-efficient:

- Add insulation to crawlspaces. This feat may be significantly more cumbersome than adding attic insulation because crawlspaces are often excessively moist. If insulation is added to moist areas of the house, care should be taken to ventilate the area, perhaps with the assistance of an exhaust fan.
- Add weatherstripping to doors and windows. A common problem in historic buildings is leaky windows and doors, which can be mitigated by caulking open cracks and joints. Be sure to only use appropriate colors that do not interfere with the historic character of the house. Also, do not seal the building so much that moisture cannot escape the building.

- Add insulation to the attic. This process is often easier than adding insulation in other areas, such as in walls, and is hugely energy saving. The most common insulation materials include cellulose, mineral wool, fiberglass, and vermiculite.
- Add storm windows. Rather than removing historic windows, supplement them with storm windows that reduce thermal transmission and do not affect the historic character of the building. Storm windows can be painted if their colors are inappropriate. Care should be taken during installation to avoid damage to the historic window frames. Storm windows will be effective regardless of whether they are installed on the interior or exterior of the original frame, although this decision will have consequences; interior storm windows may cause the historic windows to become excessively cold, causing moisture to condense, resulting in peeling paint and deteriorated wood. If the storm windows are installed on the exterior, however, they may interfere with the building's image.
- Replace incandescent light bulbs with compact fluorescent light (CFL) bulbs. This change is a good idea in any home regardless of its age, but it is especially helpful in older homes because it disturbs none of the home's character.
- Replace old appliances. Old buildings often have old appliances, which should be replaced with Energy Star®-rated appliances.
- Add a shade tree. A tree can be an effective barrier against the sun during the summer months, and it increases the natural, historic appeal of an old house. A deciduous tree is best because it will lose its leaves in the winter and allow sunlight to enter the house when it is most needed. The tree should be placed at a safe distance from the house to avoid damage to the foundation and falling limbs during a windstorm.
- Install storm doors in cold climates, although they are often not cost-effective in warmer climates. Historic doors usually require little alteration, especially if they are solid wood and in good condition, or if they are critical to the historic appearance of the house.



- Vestibules are architectural features that reduce heat loss by creating an additional airspace while the exterior door is open. They are often not, however, cost-effective as an add-on due to their high price of installation. Also, they are not likely to mesh with the appearance of historic buildings.
- Replace windows. This should be done only when the historic windows are damaged to the point where repair is impractical. The new windows should be selected to match the style of the building. As mentioned earlier, the addition of storm windows is an effective, minimally invasive way to reduce utility costs.

In summary, historic homes possess qualities that make them inherently energy-efficient while simultaneously resistant to retrofits that would enhance energy savings. Homeowners should thus take care while altering their old homes, but also grateful for the hardwired efficiency they have inherited from previous generations.