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SOME THOUGHTS ON HOME ENERGY CONSERVATION

When it comes to saving heating energy, careful operation seems to trump the type of windows, type of insulation, type of heating, and all other aspects of old houses. A study we did of eight houses ranging in age from 120 to 30 years old, after the very severe winter of 2002-2003, was instructive because for houses built before the 1980s we found no relationship between age of the house and consumption of heating energy. Heating energy use, in BTU's per square foot,[1] ranged from about 55,000 to 115,000; a 1973 house, the most modern studied, has conventional modern insulation and triple-glazed modern windows but its energy costs are the highest of any house studied in spite of its construction. (Please refer to the chart at the end.) We conclude that efficient operation, including lowering temperatures, reducing heat during unoccupied periods, latching windows, keeping storm panels in place during cold weather, etc., are more important than construction specifics.

Even though operation is more important than construction, if two buildings are constructed and operated identically, the one with energy conserving features will be more efficient than the one without. Typical energy conservation improvements include the following, listed from maximum cost effectiveness to least:

1. Maximize efficiency of your heating equipment. Install (and use) a programmable set-back thermostat to reduce energy use at night and while no one is home; initial cost is very low compared to potential savings. This is the single most effective improvement you can make. Have the furnace serviced at least once a year, change filters frequently, ensure flues are correctly sized and working properly. When it is time to replace your furnace, install a high-efficiency furnace.

2. Reduce infiltration. The greatest heat loss and discomfort in almost every house is caused by infiltration; movement of air through cracks, particularly around doors and windows. Caulking the perimeter of prime window frames (not the sash or storms) and installing weatherstripping will cut your heat loss and improve your comfort considerably. Weatherstripping is not usually necessary around windows with well-fitted storm windows, but it is always cost effective to install high quality weatherstripping on both primary and storm doors.

3. Reduce conduction. The greatest conduction is through windows and doors. Many recent studies, readily available on the web and elsewhere, show modern windows with insulated glass are not superior to old, well maintained wood windows with an independent storm window. Additionally we have found most modern windows, both casement and double-hung, are not latched properly. Highly rated windows won't help save energy if they are not tightly latched. We usually recommend repairing your old windows to tighten them up, making sure they are

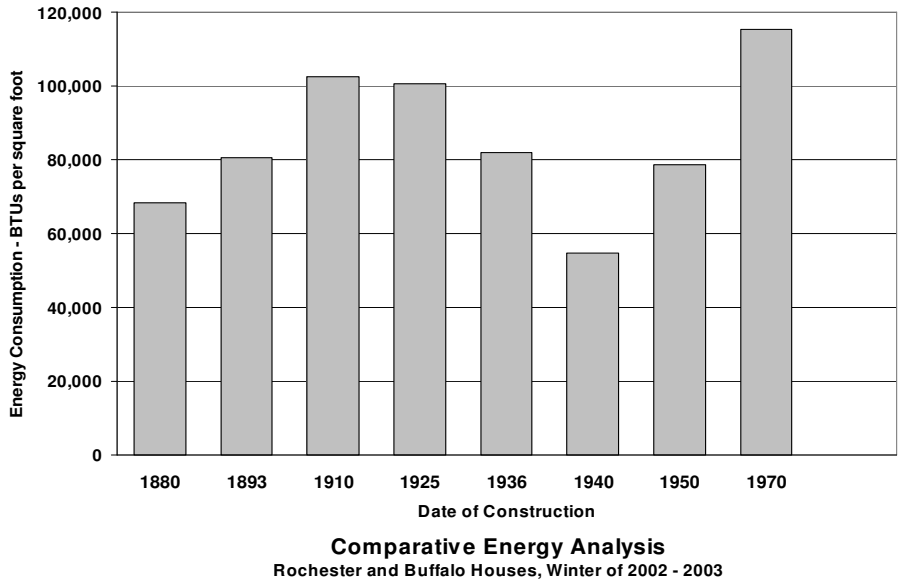
[1] Energy is commonly measured in British Thermal Units. BTUs were used in this study to make it easy to compare houses heated with natural gas to those heated with fuel oil.

fully closed and tightly latched, and installing wood storm windows and doors. Wood has better thermal characteristics than aluminum or vinyl, is architecturally and historically appropriate, and can be painted any color you like. Old storm windows are made of higher quality wood then you can buy today and are heavier, more durable, and more energy efficient than any aluminum window. Retain the old storm windows whenever possible.

4. Insulate ceilings below attics. To the extent you can provide attic floor insulation without interrupting required ventilation, it is prudent to do so. If you already have some attic insulation, a brief cost vs. benefit analysis will determine whether or not to increase it. The most effective insulation is the first few inches, beyond that the incremental value decreases rapidly. If you install insulation yourself, it is not very expensive to add. When insulating attics, maintain pathways for air to ventilate the underside of the roof deck. All shingle manufacturers and most building codes have requirements for ventilating attics.

5. Insulate the basement. The basement wall has an "R" value, a measure of resistance to the conduction of heat, of about one, similar to a single sheet of glass, so providing insulation to at least four feet below the surrounding grade is money well spent. Contractors have developed efficient and inexpensive systems to apply insulation on basement walls to comply with modern energy codes. If the upper portions of your basement walls are dry, add insulation.

6. Do not insulate the walls. When you invest dollars in energy conservation you should work first on items that generate the biggest "bang for the buck" and consider those with a lower impact later. We generally *do not recommend* insulating walls of historic houses because all the other steps are more effective at less cost and because there is a danger of moisture build-up within the walls due to condensation in the insulation. If you must insulate exterior walls, you should first remove the interior finish so a proper vapor retarder can be installed. As preservationists, we seldom recommend removing historic plaster and replacing it with inferior gypsum drywall. If you do a cost vs. benefit analysis, you will find the first five steps above may have a reasonable payback, but properly retrofitting wall insulation costs more than it's worth, even at today's energy costs.



Comparative Energy Analysis
Rochester and Buffalo Houses, Winter of 2002 - 2003