

Co-Existing with Energy Efficiency Conserve or Preserve – Do you have to choose? Energy Efficiency Around the Old House

By Noelle Lord

As someone dedicated to preserving old houses, talk of energy efficiency makes me nervous. Images of dumpsters piled high with old wooden windows, insulation company vans in every drive, and original iron radiators cast out into the mud appear in my mind. Unfortunately, this is not just a bad dream, but rather a sad movement afoot to provide quick-fix solutions and take advantage of timely business opportunities. Of course I agree that energy conservation is important, both for the planet and our pocketbooks, however, those of us with older homes have the added burden of how to incorporate energy consumption improvements in a manner which is thoughtful to our home's historic integrity.

Practical Energy Efficiency Efforts

Most everyone is doing something to try to control rising energy costs. Many of these efforts, frankly, are wrecking the place. In most cases, there is no need to make dramatic changes to an existing, older structure, but rather conduct very basic modifications and enhancements that can have a big return without a major loss of historic fabric. The fact is you can do plenty to make your older home more energy efficient and preserve it at the same time.

Real Costs

It is easy to get caught up in what seems like an immediate, resolvable issue and miss the long-term implications of a decision. Major overhauls to architecture cost a lot of money, and costs associated with demolition and disposal are often overlooked when considering remodeling expenses. Furthermore, modern materials generally have shorter lifespans so that 100 year old, old-growth, rot-resistant wood that you are pulling out is getting replaced with new, fast-growth weak-fibered wood that will not likely see the mid-century mark. Many modern upgrades also undermine older systems and cause more harm than good so consider compatibility (old houses are meant to breathe!) and get

advice from an objective old house expert not just the person you might purchase the product from.

Real costs include not only the direct costs associated with the project, but costs down the road in lifecycle costs of replacing things again and again, and environmental costs of production, transportation and disposal of materials known as Embodied Energy.

Energy Efficiency Improvements You Can Make

Seal Up Air Leaks

It is essential that air leaks are controlled. The Department of Energy estimates homeowners can save more than 10 % in energy costs simply by sealing off drafts that draw heat (and air conditioning) out of the house. Additionally, any insulating efforts will be drastically reduced (by as much as 50% in some instances!) if you do not work to eliminate air leaks. Home efficiency efforts only work really well when both heat/cooling and air flow are controlled.

Be sure gaps and cracks, inside and out, are properly caulked and sealed. Be especially mindful of interior intersections of building materials on exterior walls (walls to ceilings, at baseboards and cornerboards). Also make sure you are not allowing major air flow (loss) out your fireplaces, heating/cooling ventilation points and attic access. Keep doors and windows weather-stripped and tight, and don't forget utility access points as significant culprits of air leakage. Take the time to seal up your foundation materials including repointing masonry gaps, caulking cracks and spraying foaming insulation into gaps and crevices.

You can easily evaluate loss through air leaks yourself. On a windy day light an incense stick and hold it in front of various areas and openings (don't forget utility access points) where your interior meets your exterior. Drifting smoke indicates drafty air leaks.

Insulate Wisely

While it is true that an entire house would be insulated in the ideal world, those of us with old houses know that we rarely get to operate within ideals – that is part of the charm and character we love so much in our old place! If you happen to be replacing siding, it is a great opportunity to insulate from the outside, or if you have lost a plaster wall or ceiling it is time to add some fiberglass bats. It is not worth the cost, in resources or to your original architectural features, to rip apart your building to insulate.

The majority of heat loss in houses is through the attic and the foundation. Insulating your attic floor, and the access to your attic (think insulated trap door) is relatively unobtrusive and has a significant and instant payback on your investment and your heating or cooling bill. We recently added R-30, (confined by the depth we had in our original timber joists) to our attic floor and noticed a dramatic improvement immediately.

Selecting the right products and installing them under the right conditions is critical to getting the results you want without unexpected outcomes. Many manufacturers and installers recommend insulation must have an R-value of R-38 – R-60 to be effective. These numbers represent new construction applications and are simply not realistic when trying to retrofit. Something *is* better than nothing, and if you have access to an area of your house to insulate use the highest R-value you can fit in the space. Never cram insulation as crushing it negates its effectiveness.

This restorer, from experiences in my own old house and through unfortunate examples from countless clients, has seen little good come from the expensive effort of blowing in insulation to wall cavities. The unpredictable framing and large cavities of older construction means coverage is inconsistent and leaves the product to sink (exposing the areas that need insulation the most), trap moisture and consequently rot timbers. We have also seen its installation blow plaster off many walls leaving a costly repair in its wake.

Insulating your attic floor along and sealing air loss and drafts is projected to save 15 – 35% on energy bills!

Maintenance

Many good energy efficiency efforts are just sound maintenance that we lose sight of or just never get around to. When houses fall into disrepair and building materials are allowed to fail, energy loss becomes inevitable. Keeping a solid coat of sealer (paint) on your exterior, addressing cracks and gaps in building materials, and keeping doors and windows in good working condition represent a lot of small efforts that really add up.

Is it really an “improvement”?

Whenever you consider changes that involve the demolition of original materials you need to consider what you are losing as well as what you are gaining. Realize that piece of woodwork or plaster in your hand was hand-made by someone and is irreplaceable. The well-intentioned homeowner needs to proceed with caution toward energy efficiency measures that call for dramatic steps, and filter information against what common sense might say would work best to retain the existing built structure while incorporating improvements. The source of information is also critical to good decisions, and doing your own research is never wasted energy. Beware of companies with something to gain like selling you products, and agencies with no experience (or interest) in preservation as they will naturally develop solutions with no regard for this important piece of the puzzle.

Sidebar: Windows and Doors

Original windows and doors get one bad rap when discussions turn to energy efficiency. We are assaulted with replacement window ads at every turn stating that old wooden windows are draining your pocket and replacement windows will solve the problem. It is simply a myth that rehabilitating your old wooden windows is more expensive and can not offer the energy efficiency that a replacement window can. ***Replacement windows cost you, not save you money.***

Your original wooden windows have served the building for possibly 100 years and are still going strong (okay, maybe they're a little arthritic but that can be fixed). You can repair your wooden windows yourself with the cost of some time and a few materials, or

hire a professional to restore them for an average of \$450 - \$1,000 (depending on how much repair work is necessary) including weatherstripping and a storm window, and maintained they will last another 100 years. Replacement windows have an average lifespan of 12 – 20 years (the cheaper the window the shorter the lifespan) and replacement window parts are not repairable; windows must be replaced again once they fail. Those wooden windows (and your replacements in little more than a decade) also must be disposed of at great cost to the environment.

Aesthetics play an important role in the decision to repair or replace also. Replacement windows fit within your existing window framework, a frame within a frame, so you will lose all those inches of light exposure all around each and every window. Original wooden windows are an essential part of your home's historic façade, and shiny white replacements simply do not look the same and take away historic character and value.

Let the numbers convince you:

Do the Math

What we care about here is U-Value or the measure of the heat transmission through a window, and lower numbers indicate better insulating properties:

U-Value of a single pane window (your old wooden window): 1.10

U-Value of a single pane window combined with a storm window: 0.50

U-Value of a quality (\$450) double-pane thermal replacement window: 0.58

So your original wooden window combined with a storm window is 15% more efficient than that new replacement window! Add proper weatherstripping and you'll exceed those statistics.

More facts:

Annual energy savings comparing a single-pane wooden window to a double-pane thermal replacement window (one 3' x 5' window): 625,922 BTU

Annual savings per window (heating cost @ \$1.09/therm): \$16.70 per year

Payback based on cost of \$500 for quality replacement window installed: **30 years!!**

With a lifespan of 15 – 20 years, replacements will not last long enough to pay themselves off.

Annual energy savings by adding a storm window to a single-pane wooden window:

722,218 BTU

Annual savings per window (heating cost @ \$1.07/therm): \$19.26 per year

Payback based on \$90 per storm window: **4 2/3 years**

You can keep your beautiful wood windows with the wavy glass, and storm windows will help protect them and reduce your maintenance cycle.

Annual energy savings comparing a single-pane wooden window with a storm window to a new “low-e” double-pane thermal replacement window:

132,407 BTU

Annual savings per window (heating cost @ \$1.07/Therm): \$3.53 per year

Payback based on \$580 per “low-e” window installed: **164 years!!**

Information from Keith Haberern, registered architect, professional engineer and chairman of the Collingswood, NJ Historic Commission.

Sidebar: Energy Audits

Before jumping into action, it might be useful to assess exactly how your particular home consumes energy. One way to do this is to get an energy audit. Residential energy audits can uncover energy waste and leave homeowners with a plethora of ideas on how to button up the building and save money on utility bills. An audit should help you determine the efficiency of your home's heating and cooling systems, show you ways to conserve hot water and electricity, and leave you with a to-do list of building improvements you can make.

To a certain degree you can perform an energy audit yourself, or have a professional energy auditor carry out a more thorough audit. Many utility companies also provide auditing services, although many of them focus only on utility issues, missing broader building envelope improvements which can make significant differences in consumption.

A licensed/certified professional auditor uses a variety of techniques and equipment to determine the energy efficiency of a structure. Thorough audits often use equipment such as blower doors which measure the extent of leaks in the building envelope, and infrared cameras which detect areas of air infiltration and missing insulation. An auditor should provide you with a written report which will recommend practical improvements that can be done to weatherize your home, and changes that can be made to make it more comfortable and less expensive to heat and cool. A professional audit usually costs between \$250 - \$450. I spoke with several auditors in the course of writing this article, and most offered me “typical” advice that I would not personally implement in my old house as we are also committed to its preservation, so as always buyer beware and be smart, but an audit can give you a useful punch list of improvements to pick and choose from.

Noelle Lord operates Old House C.P.R., Inc. and shares her passion for helping owners of older buildings discover how to take good care of them through consulting, teaching and writing. She is a Contributing Editor to Old House Journal Magazine, and is currently working on The Old House Handbook for Taunton Press. She can be contacted by visiting www.oldhousecpr.com.

Old House Journal articles by Noelle to check out:

Co-Existing with Energy Efficiency, October 2007

Insulating Your Attic, April 2006

A Short Course on Caulking, February 2007

Resources:

www.eere.energy.gov/consumer/your_home

www.eere.energy.gov/consumer/your_home/energy_audits

www.energystar.gov

www.aceee.org/consumerguide

www.home.howstuffworks.com/how-to-make-your-home-energy-efficient

CHECKLIST

Here are some old-house-friendly solutions:

- ◆ Install proper weatherstripping around doors and windows
- ◆ Make sure glass in doors and windows is tightly glazed
- ◆ Use door and window locks to keep them shut tightly
- ◆ Install storm doors and windows
- ◆ Seal gaps in structural and foundation materials with caulking or spray foam
- ◆ Have your furnace/boiler cleaned and maintained annually
- ◆ Replace furnace/boiler filters regularly
- ◆ Limit draw from chimneys by keeping dampers closed when not in use
- ◆ Caulk gaps in siding and around doors and windows
- ◆ Repair rotten siding and keep paint/sealant coating in good condition
- ◆ Make sure gutters and drainage is working
- ◆ Close gaps in HVAC, chimneys and fireplaces
- ◆ Install good window treatments that seal drafts
- ◆ Lay rugs over drafty floor areas and in front of doors
- ◆ Insulate your attic floor
- ◆ Seal and insulate attic access
- ◆ Install programmable thermostats
- ◆ Buy energy efficient appliances
- ◆ Use Energy Star rated light bulbs (75% energy savings)
- ◆ Replace a tank hot water heater with tankless (50% – 70% energy savings)
- ◆ Use fans and portable electric heaters for problems in isolated areas