

## Insulation: A wise investment

By **Paul Eldenkamp**/ Special To The Tab

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**T**he Kyoto Committee of the Green Decade Coalition/Newton has been investigating insulation quality in Newton houses and has been finding lots of missed opportunities.

A well-insulated house is comfortable and treads more lightly on the environment - and it is a good investment. Let's say you spend \$4,000 on an insulation upgrade and anticipate saving \$500 in fuel costs per year. If you expect to live in your house for 15 more years, and assuming a 5 percent annual rate of increase in fuel costs, the rate of return on your weatherization investment will be 13.7 percent. That's an excellent investment from a financial perspective, aside from the benefits of increased comfort and decreased carbon emissions. (For a simple on-line tool to calculate investment return for energy improvements, see [www.energytools.com/calc/EnerEcon.html](http://www.energytools.com/calc/EnerEcon.html)).

We found three basic types of insulation problems - let's call them investment opportunities - in our initial studies of older Newton homes: no insulation, old insulation in need of an upgrade, and new insulation done badly.

Many older Newton homes have no insulation at all. Some homeowners believe that adding insulation puts an older house at risk of moisture problems, but if you have no moisture problems now, adding insulation will not create them. If you have existing moisture issues - roof or window leaks, relative indoor humidity above 60 percent in the winter, or standing water in the basement after a rain - then adding insulation may complicate the problem, so address those issues prior to insulating.

Some homeowners are not aware that they have no insulation. If you are one of them, check the attic first. If you have no insulation there, you probably have none in the walls, because the attic is the easiest place to insulate. To check if the walls have insulation, drill a 1-inch hole in an out-of-the-way place (like the back of a closet) through the plaster and lathe (no deeper) and shine a flashlight in. If you're looking into an empty cavity, you probably have no wall insulation.

In one of our "Kyoto case studies" we looked at a house that had no insulation, but which had new cooling and heating equipment that was roughly twice the capacity that would have been required had the house been insulated. That extra heating and cooling capacity cost several thousand dollars - money that would have been invested more wisely in insulation, which would have significantly reduced operating costs.

Many homeowners insulated their houses during the spikes in energy costs in the mid-1970s or early 1980s. Since then, we have learned more effective insulation methods and new products and technologies have been developed. An area of your house that may not have been cost-effective to insulate in 1980 may offer good payback now.

Air-sealing is as essential to insulating a house as insulation itself. There are two good methods for achieving this. Dense pack cellulose involves blowing cellulose insulation into walls to a density of about 3.5 pounds per foot, a density at which the material is packed solidly enough to inhibit air leakage but not so solid as to promote

heat loss through conduction. To achieve the proper density, the installer's equipment needs to be well tuned and he or she needs to know where to drill holes for maximum coverage and precisely how to insert the hose into the holes. Don't take these prerequisites for granted - ask questions.

Spray-foam insulations, such as two-part polyurethane foams and Icynene, have established track records for safety and performance. They're best used in open bays - as in walls prior to the application of the drywall and in attic rafters. Some contractors will spray foam into closed cavities such as finished walls but in that application cellulose is usually safer, cheaper, and equally effective.

Accomplishing a good insulation job in an old home can be difficult and counter-intuitive. Insulation crews tend to target easy spaces that maximize the amount of material they can install in the least amount of time. Sometimes this works, but sometimes it misses the mark.

One home we audited had had major insulation work done under a utility-company rebate program in 2001 at a cost of several thousand dollars, but the house was one of the worst performers we documented. The job had been done with a poorly tuned blower that did not generate sufficient nozzle pressure to force enough cellulose into the walls, resulting in settling of material and insulation voids. No attention had been paid to air-sealing, so there were major cold spots on interior walls because of cold air leakage into the basement, up interior chases and out through attic eaves.

To prevent such missed opportunities, the Kyoto Committee has concluded that it's worth spending \$250-350 for an energy audit that includes a blower door test and an infrared scan of your house. Audits can be arranged through Keyspan if you have gas heat and NSTAR if you have oil or electric heat. If your house has little or no insulation, do the audit as you are nearing completion of the insulation job. Prior to then, the audit will mainly document that you have a leaky house - something you knew already. After most of the work has been done, however, the audit will tell you exactly where to focus the final efforts - the infrared camera will reveal specific insulation voids in walls, and the blower door test will pinpoint areas of leakage that should be sealed, usually with spray foam insulation. If the house has been insulated with cellulose, you can use a few cans of lumberyard spray foam to provide enough air-sealing to make a big difference. However, given some of the tricky roof configurations of these older homes, you may need to hire a spray foam crew to finish the job.

In conclusion, we can say with confidence, based on our audits, that for older homes where insulation work was done in the 1970s, it's time for an upgrade from an energy savings perspective. We have equal confidence that homeowners will reap financial benefits from these improvements.

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