



An Energy Audit Is a Great Investment

In the last issue of Going Green I recommended an energy audit for people –

- 1) Looking for a high return investment opportunity.
- 2) With high utility bills.
- 3) With comfort or health and safety issues in their building.

In this issue we'll look at several examples of energy options that might result from an energy audit. While the specific list of audit recommendations will be different for every building, options might include –

- More energy-efficient windows
- More efficient appliances or lighting
- A different – or more efficient – heating and cooling system
- Sealing of leaks in the building envelope and duct system
- Solar and/or a more efficient water heater
- Solar photovoltaic (electric) system

An energy audit should provide the homeowner with an idea of the costs and savings associated with the full range of energy options that make sense for their particular building, as well as other benefits. It might also make sense to provide the return on investment for some of the higher cost items, as these are often installed with borrowed funds.

In past issues of the showcase I've given solar electric and water heating examples with returns in the range of 10% to 30%; after interest on money borrowed to make them happen. If we assume the average stock has provided a 10% average gross return over the last thirty years and that this income is taxable, which is usually the case, the net return on investment for a stock is about 7%; so with the right energy options you can do far better. In upcoming issues we'll look at solar again (our cost for solar electric panels has dropped over 30% in the last 12 months!). But for this issue let's look at several other options that I haven't covered in the past. Before we do let me review with you the assumptions.

First of all, the cost for any energy upgrade varies considerably from home to home, as does the resulting savings, so it's important to qualify this before people react by saying "I was charged a lot more..." or "I was charged a lot less for the upgrade you're writing about here!" In terms of the return on investment (Internal Rate of Return or "IRR") the assumption is that the homeowner can't afford the cost out of pocket, so they're funding the upgrades with a "refi", in this case a 30 year loan at a fixed rate of 5.5%. Understand that the term of the loan and the interest rate – like the installed cost of energy options – will vary and this will impact the IRR. Another assumption is that the savings will increase about 6% per year because energy costs have been escalating at that rate over the last 30 years.

So, now that we've got those pesky assumptions out of the way, let's look at three examples of home energy upgrade options and the benefits they offer.

Window Replacements

An older, 2700 square foot home with metal frame single pane windows is upgraded to wood framed double pane windows with Low-E, solar control glass and argon gas fill. The cost to replace the 25 windows is \$15,000 and they save \$142/yr from their \$1,255/yr total energy bill. The IRR is actually negative in this case. Now on the surface this may seem like a poor investment. But while the computer program (LBNL's Home Energy Saver) tells us what these windows will save \$142/yr in heating and cooling costs, it doesn't give us the "non-energy benefits".

Comfort, for example, isn't addressed. In reality, homes switching from leaky old single pane windows will likely have the thermostat settings raised in summer and dropped in winter, which will save more than the program would have us believe. If the home is located in an area with high levels of outside noise, the noise levels inside will be lowered significantly as well. We had replacement windows added to our home, for example, not just for energy savings but to improve comfort.

Envelope Sealing

We estimate that a house we sealed recently had about a 25% reduction in total air leakage. The cost in that case was \$1,500 and the estimated savings were \$176/yr. This translates into an 80% return on investment! What's more, the indoor air quality was improved (a non-energy benefit) because air leaking in from the damp, moldy crawlspace and rat-turd infested attic was reduced.

Duct Sealing

Another house we sealed ducts on recently had several partially disconnected supply ducts and many leaks around the joints where the flexible duct connected to metal collars. While we made many changes to the duct system, including adding an upper return grille and stretching out the bunched-up flex duct for better air-flow, the cost for just sealing the leaks was about \$800. We estimate the savings from the air sealing alone to be about \$37/yr. This translates into an 11% return on investment. And, like the envelope sealing, the duct system is no longer sucking in (and blowing through the home) hot, stinky, fiberglass and dust particle-filled air from the attic (where the return duct is located).

These are just a few examples of the many potential home energy upgrades possible. But they illustrate that, in addition to being a great investment, an energy upgrade can also improve the indoor environment and, through energy savings, reduce the outdoor pollution caused by energy waste! We'll look at more examples in the next issue. Until then, think about having an audit done on your own home. How else will you know what the relative costs and benefits of your many options are?



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