ENERGY-SAVING STARS

Being efficient about energy upgrades can save you lots of green. By Gordon Bock

The call for conserving energy is everywhere these days, from stanching global warming and weaning the U.S off of foreign fuels to just making household heating and cooling affordable.

While the siren song of energy tax credits for big-ticket building projects is tempting, if you're trying to save dollars, why not spend time, money, and effort where it will get you a payback in a timely manner? One way to do this in an old house is to concentrate on energy upgrades that are themselves efficient. Start with the simplest, lowest-investment efforts that can give you the biggest (and quickest) bang for your buck. It's a strategy that's not only easy on the pocketbook, but also has the least impact on the historic fabric of an old house.

Perform an Energy Audit

If you consider improving energy efficiency as problem-solving—and you should—the classic first step is to define and limit the problem. In an old house, this means identifying locations where the building is losing heat (or in the case of cooling, gaining heat).

ABOVE: **DIY fixes like weatherstripping around windows can add up to significant savings.**

ANDY OLENICK PHOTO

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Love the Efficiency You Already Have

Recognize and take advantage of the conservation features that may already be present in your old house. Most buildings erected before the era of cheap energy were built with materials and techniques worked out in their locale for good environmental reasons, such as solid masonry or adobe that are thermal barriers, or deep eaves that limit solar gain in summer. After the 1850s, many houses began incorporating design features that we would now call, in green building parlance, examples of passive cooling and heating, such as awnings and shade trees, or upper windows or transoms that promote interior air circulation. Getting these features functioning again—or just using them properly—can be a big energy assist, and historically in step with the building to boot.

Rather than guess, the best way to do this is to seek professional help in the form of an energy audit. Utility companies sometimes offer rudimentary versions of this service at no charge, but hiring an independent auditor will produce an analysis that's not only bias-free, but also more in-depth, with the potential to pay for itself in energy savings.

An energy audit begins by documenting the energy usage of the building (fuel and power bills, age and type of mechanical systems and big appliances, number of occupants, and energy usage patterns), then moves on to an actual examination of the building, typically with two tests. In a blower door test, the auditor attaches a fan to a door; while the fan draws air out of the house, the auditor looks for air leaks by using a puffer tool that leaves a smokelike trail where there's air movement.

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RANDY SWEITZER ILLUSTRATION

Closing gaps with caulk or spray sealant and adding insulation wherever possible will make a big difference, too.

In an infrared thermography test, the auditor surveys the building with an infrared camera that produces thermal images—their cartoon colors reveal relative conditions, such as yellowish "hot" windows indicating leaking heat, or blue-and-red walls that might indicate uneven insulation. There's no cheap substitute for a professional energy audit, but you can get a handle on some of the same leakage issues by looking for drafts with a lighted incense stick (jogging smoke signals a draft); also, any place where you can insert a dollar bill between window or building parts is a potential air path.

Make the Most of Mechanicals

One of the most cost-effective—and least invasive—energy upgrades you can undertake is simply staying on top of normal maintenance and updates to your existing mechanical systems. For example, in forced-air heating and cooling systems, replace clogged air filters and slipping fan belts so machinery operates at maximum efficiency. Check all exposed ducts for poor seals and connections—which can account for a 20-percent air loss—and fix them with duct sealant. In steam and hot-water systems, bleed radiators, replace faulty air vents, and have boilers checked and cleaned at recommended intervals.

You barely need tools or training to perform many such tasks.

LEFT: Thermal images—like those on this handheld infrared camera—can help pinpoint leaking heat (which appears as yellow and red).

For example, if foundation plantings are encroaching around your heat pump or air-conditioning condenser, they are likely blocking its ability to exchange heat and should be pruned clear by at least 3'.

Many of the new kinds of energy-thrifty equipment promoted for average houses can be helpful in an old house, too. The list is long, but runs from inexpensive programmable thermostats and low-consumption CFL and LED light bulbs to more expensive mini-split heating and cooling systems, high-efficiency water heaters and boilers, and even geothermal heating systems.

Deal With Drafts

Anyone who lives in an old house already knows that historic buildings tend to be leaky, but when it comes to plugging holes in the weather envelope (roof, walls, windows), little things add up to a lot—as much as 50 percent of the heat loss in a building. Fortunately, leaks are simple and efficient to control if you start with the biggest offenders first. Examine the house and seal up any openings with caulk or spray sealant. Gaps along the tops of foundations are almost a sure bet, as are wall penetrations from long-gone plumbing pipes or electrical installations that were sealed poorly or not at all. In basements, crawlspaces, and attics, focus on large cracks and anywhere sunlight is visible; dirty areas on insulation are telltale signs of air movement. Also seal around chimneys and masonry, and examine where different materials meet. Pay particular attention to plumbing, dryer, and kitchen vents; electrical outlets; and recessed lights and registers in second-floor ceilings. Fireplaces also are major air passages that, when not in use, should be blocked with a closed damper and even a solid screen across the hearth.

Windows get a lot of scrutiny in the hand-wringing over energy efficiency, and while a single-pane window alone is not the thermal barrier that a new double-pane window can be, studies show that old sash with well-fitting storms is quite comparable (see "Investing in Storms," right). Studies also indicate that much of the heating (or cooling) loss in windows—historic and recent replacements alike—isn't through the glass, but through air infiltration, which is manageable. Start by making sure the window is in good working order, with sashes snug in their channels and closing at top and bottom. Next, make sure that sash locks pull the meeting rails snugly together (their main purpose over and above security). Then get out the caulk gun and seal up any exterior cracks between the trim and the siding. (For more tips on tuning up sash windows, see page 54.)

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LEFT: Adding insulation is crucial, particularly in areas that are easily accessible, such as basements and attics.

If you want to get in deeper (especially if you're otherwise removing the sashes for overhaul), you can retrofit the window with weatherstripping. There are many designs on the market, but a lot of professional restorers favor neoprene bulb types that slide into a kerf (saw blade cut) made with a router or on a table saw. Most agree that the places for bulb weatherstrips are along the top of the top sash, the bottom of the bottom sash, the meeting rail on one sash, and on the stop moldings where they meet the inner sash.

Some folks find that the sash channels themselves are a source of air movement, and also install channel liners to improve the seal where the inner and outer sash slide. For those who feel that their weight pockets would be better filled with insulation (especially where the weights are long gone), it's possible to retrofit traditional sash with spring balances.

While you're weatherstripping your windows, do the same for their larger cousins: exterior doors. If the doors are already fitted with spring metal or bulb weatherstrips, check their condition, make repairs, and adjust any moveable stops for a proper seal. Pay particular attention to the bottom of the door, which can be fitted with a sweep-type weatherstrip to seal tightly against the threshold.

Insulate Strategically

There's no question that improving the thermal efficiency of the entire building enve-

Investing in Storms

If there has ever been an old-house energy mantra, it's storm windows, storm windows, storm windows. Ageless as this technology is, it still stands up to science and economics because the air space created by adding a storm—whether on the interior or exterior of the prime window—slows the transfer of heat. A storm can just about double the R-value of a window, bringing it close to the performance of a double-glazed window; plus, it keeps the historic window in the building and out of a landfill. In addition, storm windows can be made with low-E or laminated glass that will enhance energy conservation without tampering with the prime window.

ANDY OLENICK PHOTO

CLOCKWISE COURTESY MITSUBISHI, WINDOW QUILT, GE, ATTICCOVERS.COM, EMERSON

Small Changes Add Up

Today, there are many low-impact ways to add to your energy-savings bottom line. Clockwise from left: Window Quilt's insulated window treatments keep drafts at bay. Mitsubishi's M-Series split HVAC system can efficiently heat or cool a room without ductwork. A faceted vanity globe is a new halogen offering from GE. Adding an insulator to the attic access, like this one from Attic Covers, keeps drafts out of the house. Inexpensive programmable thermostats, such as Emerson's White-Rogers series, let you preset temperatures for maximum savings.

lope has the potential to mitigate heat and cooling losses, but adding insulation to walls can be a significant project. However, using the same best-bang-for-your-buck yardstick, you can make significant improvements without going off the deep end mechanically or financially by insulating two of the most important parts of the building: the attic and the basement or crawlspaces.

Once you consider that most heat is lost vertically through the roof, and that attics are typically the most accessible parts of the building's bones, adding attic insulation becomes a no-brainer. If the attic is unfinished (a "cold attic"), you have an ideal opportunity to add loose fill or batt insulation between the rafters, which is not only relatively easy, but also efficient, because you're limiting the thermal envelope to just around the living space. If there is already insulation between the joists—say, a few inches of loose fill from decades ago—you can add more unfaced batt insulation right on top of this to increase the R-value. Experts say that once you exceed the height of the joists, you can keep going to a depth of 10" to 14" by laying the blankets perpendicular to the joist bays. This insulates over the joists and mitigates them as thermal conductors. (Make sure you leave air passages where the joists meet the eaves.)

The alternative to insulating the attic floor is to insulate the underside of the roof—an approach that increases the thermal envelope's volume, but one that's desirable if the attic will be used more as a living space or if it contains mechanical equipment (air conditioning and ducts) that will run more efficiently when cool. In this scenario, moisture is more of a concern. Batt insulation with paper or foil facing should be installed with the facing toward the living space—that is, toward the installer. Maintaining ventilation paths is also critical at the bottom and top of the rafter bays. Don't forget to insulate and seal the access to the attic, whether it's a conventional door or a simple hatch.

Basements and crawlspaces are often the second most cost-effective line of insulation attack. If the basement is unfinished and doesn't contain equipment, consider adding insulation between floor joists to create a thermal barrier to the living areas above. Be sure to install the insulation with the facing toward the living space (in this case, away from the installer). Also, it pays to limit moisture collection in these spaces by laying a moisture barrier (typically heavy plastic sheets) on exposed dirt floors or by pouring a concrete floor.

Once you've worked your way through these upgrades, you can step back and consider the list of larger and more time-consuming improvements, such as adding vestibules to exterior doors, or maybe even a solar collector somewhere. By that time, you'll already be enjoying the improved energy savings and comfort of your more efficient old house.

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