

A Guide to Making Energy-Smart Purchases

Written by Lisa Alexander

Tuesday, 17 August 2010 14:24 -

A Guide to Making Energy-Smart Purchases If you feel that energy bills are taking a big chunk of change out of your pocket, you are not alone. Americans spend more than \$115 billion each year on fuel and electricity for their homes. On the average, heating and cooling (space conditioning) account for about 45% of the energy a home uses. Water heating consumes about 14%, and appliances and other sources consume about 41%. Though energy use varies among homes, there are many ways to lower your energy bills.

Investments in products or systems designed to save energy can provide a return through future savings from lower energy bills. They also reduce the impact of rising fuel prices and usually help improve the environment. However, poor choices of such products or systems can be disappointing and aggravating. Whether you are buying a new heating system or "tightening up your home," be sure to investigate the options before investing.

Knowing Your Needs

An energy audit is one of the best ways to determine the most cost-effective measures for reducing energy bills. Energy audits can locate areas where energy is wasted and can determine the efficiency of your heating and cooling systems. Energy audits vary in complexity. You can perform a simple audit yourself by examining your home for obvious leaks or ensuring that appliances work efficiently.

More thorough audits can be conducted by "house doctors," who usually work in teams using special equipment such as blower doors, infrared cameras, furnace efficiency instruments, and surface thermometers. This equipment allows them to find inefficiencies that a visual inspection could not detect. House doctors also analyze previous energy bills and implement some energy efficiency measures at the time of the audit. This type of energy audit, however, may be relatively expensive.

Some utilities offer energy audits for free or for a nominal charge. The extent of these audits varies. Auditors from utilities may or may not use special equipment such as blower doors and infrared cameras, and they may or may not check the performance of your heating system.

Determining Your Priorities

Results from the energy audit can direct you to the changes that would be most appropriate to improve the energy efficiency, or "tightness," of your home. Before you purchase an energy-related product or system, though, you should answer some important questions.

What are your budgetary limits? Which areas are causing your greatest energy losses? How long can you wait for the investment to pay for itself in energy savings? How much time and

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money are you willing to spend on maintenance and repair? Are you investing solely to save on energy bills or are other factors also important?

Many options that improve energy efficiency are available. Although installing caulk, weatherstripping, and insulation may not be as exciting or impressive as a ground-source heat pump, such energy efficiency measures are very often cost effective. Indeed, if you decide to install a heating or cooling system, you should first ensure that your home is properly weatherized. Using energy efficiently reduces demands for heating, cooling, and electricity, thereby allowing a smaller, less expensive system to be used.

Because of the high percentage of your energy bill that goes toward conditioning the air in your home, detecting heat losses and gains is a great place to start when deciding what measures may improve the energy efficiency of your home. Leaky windows and doors, open fireplace dampers, poorly insulated attics and walls, and cracks and holes in the walls and ceiling are all areas where heat can escape in the winter and enter in the summer. Heat can also escape through light fixtures and switches, electrical outlets, and leaky ducts.

Appliances and equipment can also have a tremendous effect on your energy costs. Hot water heaters, stoves, refrigerators, dishwashers, and clothes dryers can contribute to excessively high energy bills when they operate inefficiently. Poorly sized and inefficient heating and cooling systems can lead to high costs for space conditioning.

When you decide to implement energy efficiency measures, you can determine the most appropriate product or system by investigating the options. The energy efficiency projects addressed here are divided into two categories...weatherization projects and energy-efficient appliances.

Weatherization Projects

Weatherization projects insulate and tighten the shell of the home. Such projects include, but are not restricted to, caulking and weatherstripping, improving or replacing windows, and installing insulation.

Caulking and Weatherstripping

Caulking and weatherstripping are the easiest and least expensive weatherization measures and can save more than 10% on energy bills. They are usually do-it-yourself projects. Choose your supplies carefully and follow instructions closely. High-quality materials and proper installation ensure that you receive maximum performance from your investment.

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Caulking and weatherstripping are most often applied to doors and windows, which account for about 33% of a home's total heat loss. Because windows outnumber doors, energy efficiency features of windows are particularly important to lowering energy costs.

Installing Insulation

Insulation is probably the most important consideration in improving the energy efficiency of a home. The type and amount of insulation you choose will directly affect energy costs. Factors to weigh in making a decision about insulation material include insulative value, cost, flammability, toxicity, durability, and availability.

When purchasing insulation, check the product label to make sure the material meets specifications of either the federal government or the American Society for Testing and Materials. The label should indicate the insulation material, R-value, quantity, and the name and address of the manufacturer or distributor. It should also state how much area the insulation can cover, where the insulation can be installed, what the fire resistance of the material is, and what safety precautions should be taken for installation and use.

If you choose to install the insulation yourself, wear proper clothing and learn how to properly install the insulation to avoid fire hazards and moisture problems. You should also determine if a vapor retarder or other moisture control measure is needed. You may also choose to hire a contractor. The Insulation Contractors of America (see the Source List) can help you find a certified contractor in your area. You can also check the Yellow Pages.

Improving or Replacing Window

Single-pane windows are the most inefficient ones, but it is possible to increase their efficiency. You can install storm windows to add insulating value and reduce air leaks. The simplest type of storm window--a plastic film taped to the inside of the window frame--is usually available in prepackaged kits. It can be installed and removed easily, but it also may damage easily and reduce visibility. Another type, which uses rigid or semirigid plastic sheets (e.g., plexiglass, acrylic, polycarbonate, fiber-reinforced polyester) can be fastened directly to the frame or mounted in channels around the frame.

Storm windows made of glass can be attached to the frame with clips or screws. Storm window units should have weatherstripping at all joints, be made of strong, durable materials, and have interlocking or overlapping joints.

If your windows need to be replaced, there are many new types of energy-efficient glazing and

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frames on the market that suit different purposes. Glazing materials are made of glass or plastic; frames are available in aluminum, wood, vinyl, fiberglass, or combinations of these materials. Each type of glazing material and frame has advantages and disadvantages. Glass is durable and allows a high percentage of solar energy to enter buildings. Plastics can be stronger, lighter, cheaper, and easier to cut than glass, but not as durable and more susceptible to the effects of weather.

When comparing the different types of materials, note whether the glazing is most suitable for blocking or allowing solar gain. (If you live in a hot climate, you will probably want to block out solar gain). You can compare the energy efficiency of similar models by checking written information available from the retailer or manufacturer.

Manufacturers usually represent the energy efficiency of a window as the R-value, or the measure of resistance to heat flow. R-values range from about 0.9 to about 3.0. If the R-value is high, less heat will be lost. Manufacturers may also use the U-value, the measure of heat flow, to indicate a window's energy efficiency. U-values are the reciprocal of R-values. U-values range from about 1.1 to about 0.3. If the U-value is low, less heat will be lost.

When you are comparing glazing, it may be helpful to determine if the U-or R-value is indicated for the entire window or just for the center-of-glass. A window with a high R-value based on the center-of-glass may not be as efficient as one with a lower R-value that is based on the entire window.

Energy-Efficient Appliances

The energy efficiency of similar appliances can vary significantly. It is usually more cost effective to purchase appliances with high efficiencies. Determining and comparing the energy efficiency of different models is usually easy, because federal regulations require many types of appliances to display EnergyGuide labels. A label or energy-use information in the product literature is required for furnaces, refrigerators, refrigerator-freezers, freezers, water heaters, washing machines, dishwashers, room and central air conditioners, heat pumps, and fluorescent lamp ballasts. EnergyGuide labels indicate either the annual estimated cost of operating the system or a standardized energy efficiency ratio.

You can also maximize the efficiency of appliances you already own through regular maintenance and tune-ups and system upgrades. Examples of some things that you can do are:

Check air filters in heating and cooling systems monthly during the seasons they are in use and clean and replace them as necessary.

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Clean air vents, baseboards, and radiators regularly and keep them unrestricted by furniture, carpets, or drapes.

Release trapped air from hot water radiators once or twice a season by opening the valve until nothing but water comes out.

Follow prescribed maintenance (e.g., maintaining certain water levels in steam heat systems).

Install an insulating jacket on your hot water heater, insulate hot water pipes, and lower the water heater temperature.

Clean refrigerator coils yearly and maintain internal temperatures between 36 degrees F (2.2 degrees C) and 38 degrees F (33 degrees C) for the refrigerator compartment and between 0 degrees F (17.8 degrees C) and 5 degrees F (15.0 degrees C) for the freezer compartment.

Move the refrigerator if it is currently located near the stove or dishwasher.

Regularly defrost refrigerators that do not have a completely automatic defrost capability to eliminate ice build-up on interior coils.

Clean dryer filters after each use or as necessary.

More complicated jobs, such as furnace tune-ups, will need to be performed periodically by a trained technician. Companies that sell oil and gas usually have trained technicians who can tune-up your furnace or boiler.

Sometimes independent companies provide this service as well. For professional service for other home appliances, you should contact the business where the appliance was purchased.

If You Need a Contractor

You may find that many improvements involving energy efficiency require a contractor for installation. While finding a quality contractor at the best price can be a little confusing, these suggestions may help along the way.

Try to limit your choices to local contractors. They are usually less expensive. Check the Yellow Pages for the type of contractor you need. Inquiring about contractors through friends and relatives can help you narrow the field.

Obtain at least three bids before signing a contract. The greater the selection, the greater the chances of finding the right contractor for the job. All terms in the bids should be similar and all

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details should be in writing. Depending on the job, you should have the contractors visit the site before bidding on a project.

Make sure that the contractors are licensed and have liability insurance.

Find out the contractors' previous experience and ask for references. How many jobs have they completed? Have they had any formal training in installing the specified product or system? You should also check their record with the Better Business Bureau.

Include in the contract the dates that you expect services to begin and end. This protects you from contractors who begin a job very late or leave a job and return at a much later date. You may also want to specify payment for starting a project late. (You can lose money when contractors are late because the savings that the project would have incurred had it been installed are lost.)

Never fully pay contractors before they start the work. Pay the contractor in increments (e.g., at the beginning, the middle, and the end of the job).

Find out if the contractor will allow you to buy the materials. Sometimes the materials are less expensive when you purchase them yourself.

Note whether you need permits and whether permits are included in the contract. Some contractors require you to purchase and obtain these yourself. Obtaining permits can take many hours. If the contractor is obtaining the permits and is being paid at an hourly rate, find out if he or she is charging by the hour to obtain the permits.

Beware of contractors who bid much lower than others for the same job. You should thoroughly read and understand the contract before signing it. Make sure that a cancellation form is attached as required by consumer protection laws. This allows you to cancel a contract worth over \$25 before midnight of the third business day after the transaction.

Making Good Investments

Most consumers are looking for the greatest return for the least investment. This does not necessarily mean, though, that you should buy the least expensive product or system on the market. In fact, spending a little more money initially for an energy-efficient product or system (as opposed to spending less and sacrificing energy efficiency) is often more economical in the long run because your investment will pay for itself in energy savings.

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Generally, there are two ways to analyze the costs of energy efficiency investments: simple payback period, which is the amount of time required for the investment to pay for itself in energy savings; and full life-cycle cost, which is the total of all costs and benefits associated with an investment during its estimated lifetime.

You can obtain an estimate of the simple payback period by dividing the total cost of the product by the yearly energy savings. For example, an energy-efficient dryer that costs \$500 and saves \$100 per year in energy costs has a simple payback period of 5 years.

Computing life-cycle costs is more difficult. Life-cycle costing is a method of economic evaluation in which all values are expressed as present dollars. This evaluation method sums the discounted investment costs (less salvage value); operation and maintenance (nonfuel) and repair costs; replacement costs; and energy costs of an appliance or building system. For definitions of these terms and the formula for performing life-cycle cost analyses, see the "Life-Cycle Costing Manual for the Federal Energy Management Program," NBS Handbook 135, Revised 1987. This manual is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

Before making your decision, examine your budget, the expected payback periods, and estimated lives of different alternatives. Products or systems with payback periods that approach or exceed their projected life are usually not worthwhile. Compare the life-cycle costs of similar products or systems. These include installation (if any), operation, and maintenance costs.

Although most of the federal tax incentives of the early 1980s have been discontinued, your state or local government may offer economic incentives or financial assistance to implement energy efficiency measures. Also, check with your local utility to see what incentives are available.

If you are buying a new home, you may want to investigate the possibility of obtaining an energy-efficient mortgage (EEM). EEMs allow home buyers to qualify for a larger mortgage by allowing a higher debt-to-income ratio than lenders normally use to calculate loan potential. EEMs allow the significant monthly energy savings of an energy-efficient house to be put toward a higher monthly mortgage payment. Home buyers upgrading an existing home to qualify as an energy-efficient home may add the cost of energy measures to the mortgage. By adding this cost into the mortgage, the home buyer may profit from the tax benefits and longer term interest rates.

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You can find out if EEMs are an option for you by asking your lender. Four federal lending programs--Federal Home Loan Mortgage Corporation (Freddie Mac), Federal Housing Administration (FHA), Federal National Mortgage Association (Fannie Mae), and Veteran's Administration (VA)'soffer EEMs. Therefore, EEMs are available nationwide. Unfortunately, most lenders and home buyers are either unaware of EEMs or choose not to use them

If you feel that energy bills are taking a big chunk of change out of your pocket, you are not alone. Americans spend more than \$115 billion each year on fuel and electricity for their homes. On the average, heating and cooling (space conditioning) account for about 45% of the energy a home uses. Water heating consumes about 14%, and appliances and other sources consume about 41%. Though energy use varies among homes, there are many ways to lower your energy bills.

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What are your budgetary limits? Which areas are causing your greatest energy losses? How long can you wait for the investment to pay for itself in energy savings? How much time and money are you willing to spend on maintenance and repair? Are you investing solely to save on energy bills or are other factors also important?

Many options that improve energy efficiency are available. Although installing caulk, weatherstripping, and insulation may not be as exciting or impressive as a ground-source heat pump, such energy efficiency measures are very often cost effective. Indeed, if you decide to install a heating or cooling system, you should first ensure that your home is properly weatherized. Using energy efficiently reduces demands for heating, cooling, and electricity, thereby allowing a smaller, less expensive system to be used.

Because of the high percentage of your energy bill that goes toward conditioning the air in your home, detecting heat losses and gains is a great place to start when deciding what measures may improve the energy efficiency of your home. Leaky windows and doors, open fireplace dampers, poorly insulated attics and walls, and cracks and holes in the walls and ceiling are all areas where heat can escape in the winter and enter in the summer. Heat can also escape through light fixtures and switches, electrical outlets, and leaky ducts.

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Weatherization Projects

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If your windows need to be replaced, there are many new types of energy-efficient glazing and frames on the market that suit different purposes. Glazing materials are made of glass or plastic; frames are available in aluminum, wood, vinyl, fiberglass, or combinations of these materials. Each type of glazing material and frame has advantages and disadvantages. Glass is

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- Obtain at least three bids before signing a contract. The greater the selection, the greater the chances of finding the right contractor for the job. All terms in the bids should be similar and all details should be in writing. Depending on the job, you should have the contractors visit the site before bidding on a project.
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If you are buying a new home, you may want to investigate the possibility of obtaining an energy-efficient mortgage (EEM). EEMs allow home buyers to qualify for a larger mortgage by allowing a higher debt-to-income ratio than lenders normally use to calculate loan potential. EEMs allow the significant monthly energy savings of an energy-efficient house to be put toward

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a higher monthly mortgage payment. Home buyers upgrading an existing home to qualify as an energy-efficient home may add the cost of energy measures to the mortgage. By adding this cost into the mortgage, the home buyer may profit from the tax benefits and longer term interest rates.

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