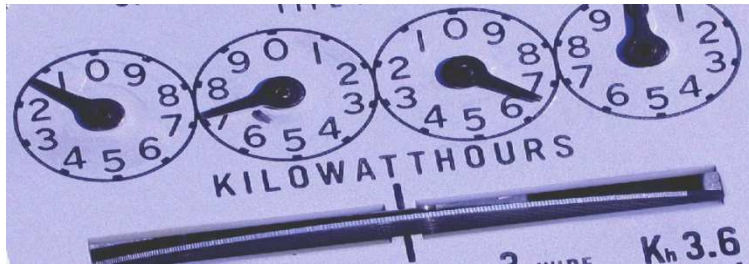


Do-It-Yourself Home Energy Audit

Provided by Baltimore County's
Office of Sustainability



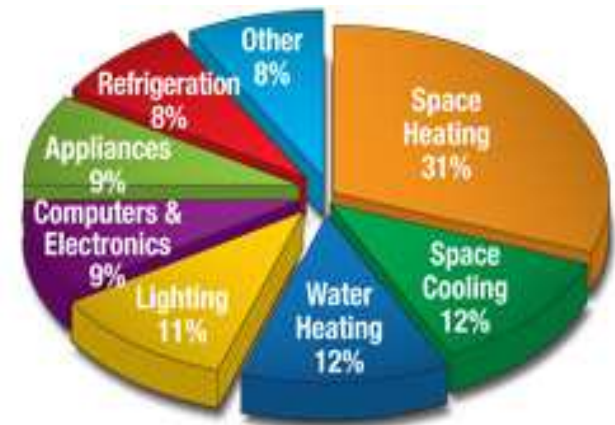
The first step to reducing your utility bills is to determine how you use, and waste energy. A home energy audit is a good place to start, and is relatively simple to do with the right tools. To cut costs, you need to understand how your house and systems operate, and identify areas for improvement. Professional home-energy audits are available by many local energy companies. However, there are also additional resources online that provide more extensive do-it-yourself energy audits. Making changes can save as much as 30 percent of your utility bills, and potentially reduce your CO₂ emissions by 9,515 pounds a year. (Go Green, Live Rich)

One important part of conducting your energy audit is to monitor changes in your energy bills. Most companies allow you to track usage and costs by month, comparing compatible times during the previous year. While the rate is important, unit usage is the real gauge. As you implement energy saving practices, track your progress using your energy bills and an electricity monitor for appliances.

Every home's energy use is slightly different, but the energy saving measures provided can apply to virtually any home. The home improvements are relatively simple and require few supplies. They have been generated from a number of sources, which are identified after each tip, and from the Office of Sustainability personnel.

This energy audit will require you to investigate parts of your house that you might not know affect your energy bill. Some of the factors contributing to your bill include insulation levels, tightness of windows and doors, what types of appliances you're using and how often, and other elements. Learning how your home works can not only save you money, but also produce a more comfortable place to live.

Average U.S. Household Energy Consumption



Source: 2007 Buildings Energy Data Book, Table 4.2.1., 2005 energy cost data.

Energy in Your Home: Where does it all go?

- Heating & Cooling Systems
- Air Leaks: Windows, Doors, Attics
- Hot Water Heating
- Lighting Fixtures
- Computers & Electronics
- Refrigerators, Dishwashers, Washer & Dryers

Heating Your Home: 31% of energy consumption

Supplies*

*(Prices may vary)

Furnace filter: \$10-\$40 depending on quality

Weather-stripping: \$5-\$20

Air duct tape \$15-\$20

Garage Door Insulation Kit: \$65-140 depending on size of garage

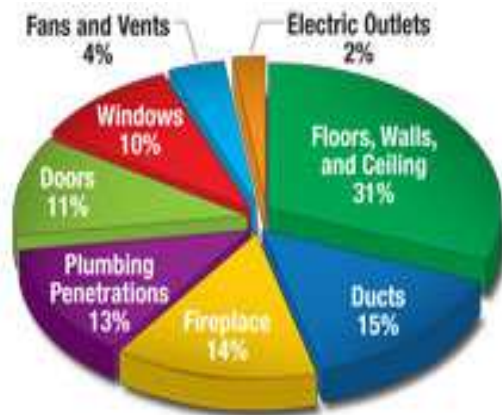
- During heating season, replace the furnace filter once a month. ([PopularMechanics](#))
- If you have hot water or steam heating systems, make sure to 'bleed' air out of the system at the beginning of the heating season to maximize efficiency.
- Insulate heating ducts in unheated areas, such as attics and crawlspaces. Keeping ducts in good repair can prevent heat loss of up to 60 percent at the registers. ([EERE](#))
- Partially or completely close register dampers in rooms that are rarely used. ([PopularMechanics](#))
- Close the fireplace damper when the fireplace is not in use to prevent warm air from being drawn up the chimney. ([PopularMechanics](#))
- If you use a woodstove, make sure the chimney pipe is clean.
- Install glass doors for the fireplace if you use it frequently. Fireplaces can be romantic, but often draw warm air out of the room. ([BG&E](#))
- Eliminate drafts by installing weather-stripping and sweeps on any exterior doors, including garage doors. ([BG&E](#))



- If you use your garage often in the winter, you can use a garage door insulation kit to help retain heat better. The insulation can also double as a way to keep heat out during the summer. ([Energy Efficient Solutions](#))
- Install foam gaskets behind drafty switch and receptacle cover plates. ([PopularMechanics](#))
- Weather-strip around the attic door, access hatch, or attic fan (when not in use). ([PopularMechanics](#))
- Check the insulation levels in your attic. The R-value indicates the product's resistance to heat flow. The higher the R-value, the better the product insulates. Increasing insulation to at least R-30 is a good investment. R-30 insulation is around 10-14 inches deep. ([BG&E](#))
- To reduce heat loss in old attics, insulate it with loose-fill cellulose insulation. It can be blown under the flooring, between the floor joists, and in hard-to-reach spaces. ([PopularMechanics](#))
- Check sill plates (where walls meet the foundation) for gaps and lack of insulation. Also, check attics to make sure insulation extends to protect walls.
- Check for air leaks along the baseboard where the wall meets the floor.
- If your home has an open central hall, close off heated first floor rooms to reduce heat loss to upper levels.

- Arrange your furniture and other obstructions so they don't cover heat registers, or add scoop-shaped heat deflectors to the tops of registers. The deflectors will direct hot air under furniture and into the room. ([PopularMechanics](#))
- Check air ducts for any possible air leaks. Seal leaks with rated air duct tape. ([CPS Energy](#))
- Consider installing a humidifier if your home is dry in the winter. This will help you feel warmer at lower temperature settings. Keep the humidity level between 35-40%. ([BG&E](#))
- During winter, open curtains on your south-facing windows during the day to allow sunlight to naturally heat your home. Close them at night to reduce the chill you may feel from cold windows. ([EERE](#))

How does air escape from your home?



Source: U.S. Department of Energy. Energy Savers Booklet.

Air infiltrates in and out of your home through every hole and crack. About one-third of this air infiltrates through openings in your ceilings, walls, and floors. These leaks reduce the efficiency of your heating or air conditioning, and waste a lot of money.



By fixing poor insulation and reducing drafts and other air leaks, you can save up to 20 percent on your energy bills, and reduce your home's CO2 emissions by 2,808 pounds of a year. (Go Green, Live Rich)



Home Cooling: 12% of energy consumption

Supplies:

Air Conditioner Filter: \$5-\$20 depending on quality

Programmable Thermostat: \$40-\$75

Window Film: \$25-\$35

- Don't use an oversized room air conditioner for a smaller room since it performs less efficiently than a smaller, properly-sized unit. The same goes for central systems, which need to be sized by professionals. ([PopularMechanics](#))
- When replacing old air conditioners units, install ones with a higher energy efficiency ratio (EER) than previously used to reduce operating costs. ([PopularMechanics](#))
- Use air conditioning only when you're home. Leaving it on all day when your home is unoccupied wastes more energy than starting it up when you get home. ([PopularMechanics](#))
- When running the air conditioner, use the 're-circulate' option so it cools relatively cooler interior air rather than hot exterior air. ([PopularMechanics](#))
- Try to place air conditioning units in windows without full sun exposure.
- Clean the filters on room air conditioners every two weeks and clean the cooling fans on central systems every month. ([PopularMechanics](#))

- Use window and ceiling fans, which require only 10 percent of the energy that air conditioners use. They'll mix rising warm air and circulate it downward to maintain comfortable, even temperatures more efficiently. ([PopularMechanics](#))
- Reduce attic temperatures by installing vents in the backside of the roof. The vents can cost about \$10 a piece; consult a contractor or supplier to determine how many you need. Consider installing a temperature-driven vent fan to move hot air out of the attic. ([PopularMechanics](#))

Temperature & Thermostat:

- Check the location of your thermostat. It should be away from outside doors and in a room or hallway that represents your comfort level.



- Install a programmable thermostat. By automatically lowering your heat setting or raising your cooling setting at night or during other unoccupied hours, you can save significant amounts of energy. ([CenterPoint Energy](#))

- Do not constantly change settings on your thermostat. There are generally 3 setting levels; at home, sleep, and away.

Adjusting your thermostat up or down by just **3 degrees** all year round can save you roughly **\$115** on a 1,500 square foot home. The biggest savings can be seen during the colder months when every degree you *decrease* your thermostat, you can reduce your energy bill by as much as 5 percent. For every degree you *increase* your thermostat in the summer, you can save up to 3 percent off your energy bill. (Go Green, Live Rich)

Windows:

- Apply window film to reduce heat gain in the summer, and retain heat in the winter. ([CenterPoint Energy](#))
- Replace leaky windows with energy-efficient models or boost their efficiency with weather-stripping and storm windows.
- Close all the shades, curtains, draperies, and windows on the south, east and west sides of the house on hot days.
- Avoid opening windows on sunny sides of the house as hot air from brick or siding will be drawn into your room.

Water Heating: 12% of Energy Consumption

Supplies:

Water Heater Insulating Blanket: \$10-\$30

Energy Efficient Showerhead: \$10- \$50

Faucet Flow Restrictors/Aerators: \$5-\$15

- Many water heaters are set at a higher temperature than needed. Turn down your water heater temperature to 120°F. Every reduction of 10°F can save up to 5 percent on heating costs. ([PopularMechanics](#))
- Use an insulating blanket to insulate your electric hot-water storage tank, but be careful not to cover the thermostat. Follow the manufacturer's recommendations. ([EERE](#)) The insulating blanket will help reduce heat loss through the walls of the tank by 25-40%, which can save you 4-9% on water heating bills. ([ACEEE](#))
- Insulate your hot water system piping. Apply insulating material on pipes from the boiler to the heating equipment. ([CenterPoint Energy](#))
- When going on vacation, lower the temperature on your water heater. Consider turning off your electric water heater at the circuit breaker or turning your gas water heater to the pilot setting. Many new water heaters have vacation settings. ([BG&E](#))

- Fix faucet leaks. A drop a second can cost you \$1 per month in wasted hot water. ([PopularMechanics](#))
- Consider taking a shower instead of a bath; showers on average use 50% less water. ([BG&E](#))
- When replacing your toilet, buy a dual-flush mode. These toilets have separate buttons for big and small flushes, using 1.6 and .9 gallons, respectively.
- Install energy-efficient showerheads—one 10-minute shower per day with an energy efficient showerhead can save 10,000 gallons of water a year. ([BG&E](#))
- Install faucet flow restrictors and/or aerators—they can save on average 4,000 gallons of water a year. ([BG&E](#))

Lighting: 11% of energy consumption

- Replace incandescent bulbs with CFLs. *Note: Don't place in dimmer switches.* ([PopularMechanics](#))
- Try to use more task lighting than general lighting. ([PopularMechanics](#))



- Use three-way bulbs in lamps and use properly—higher wattage for tasks like reading and lower wattage for general lighting, watching television, etc. ([BG&E](#))
- If you leave lights on as a security measure when you are away, put them on timers. ([PopularMechanics](#))
- Use solar-powered lights for lighting the exterior of the house. ([PopularMechanics](#))



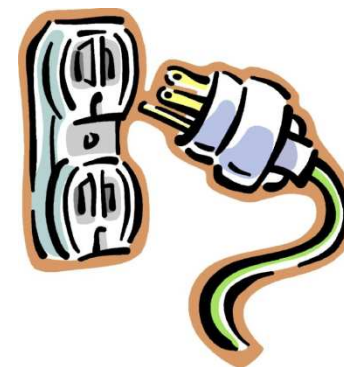
Each Energy Star CFL bulb can save you \$30 over the lifetime of each bulb. These units last 10 times longer, generate 90% less heat, use 75% less energy and produce more light per watt. (Go Green, Live Rich)



Computers and Electronics: 9% of energy consumption

Even when your appliances are in the 'off' position, or in standby power or idle mode, they continue to use energy. This energy drain is known as "phantom load," and can account for roughly 5 to 15% of your monthly electricity bill. The "phantom load" contributes more than 27 million tons of CO₂ emissions in the US every year. (Go Green, Live Rich)

- Plug electronics into a power strip so that you can turn them all off when you are not home, on vacation, or not using appliances for an extended period.
- Consider using a plug-in electricity monitor to measure use by major appliances.
- Turn off home electronics when not in frequent use, such as DVD players, speakers, printers, etc. ([PopularMechanics](#))
- Put your PC to sleep or completely off. Save \$25 to \$75 each year by using the system standby or hibernating feature on your computer. Turning off your computer each night won't affect its performance. ([EnergyStar](#))



Appliances: 9% of energy consumption

Laundry:

- About 90% of the energy used for washing clothes in a conventional top-load washer is for heating the water. There are two ways to reduce the amount of energy used for washing clothes—use less water and use cooler water. ([EERE](#))
- Only run full loads of laundry, not partial loads. If you must run a smaller load, select the appropriate water level. ([PopularMechanics](#))



- Wash and rinse on the **cold** cycle as much as possible. The difference in cost between the cold/cold and hot/hot cycles can be as much as 60 cents per load. Most detergents today are designed for cold-water settings. ([PopularMechanics](#))
- Don't over-dry your clothes. If your machine has a moisture sensor, use it. ([EERE](#))
- Improve the efficiency of the dryer and reduce the risk of fire by cleaning the dryer lint from the trap after every load. ([PopularMechanics](#))
- Periodically inspect your dryer vent to ensure it is not blocked. Manufacturers recommend using rigid venting material, not plastic vents that may collapse and cause blockages. ([EERE](#))
- Dry towels and heavier cottons in a separate load from lighter-weight clothes. ([EERE](#))
- Use the cool-down cycle to allow the clothes to finish drying with the residual heat in the dryer. ([EERE](#))
- Hang up garments immediately after drying to reduce the need for ironing. ([BG&E](#))

Dishwashing:

- Use the 'air-dry' cycle on the dishwasher instead of the heat-dry cycle. If you don't have an automatic air-dry switch, turn off the control knob after the final rinse and open the door so the dishes will dry faster. ([EERE](#)) In the winter, this can also add heat and humidity to your home.
- Buy a dishwasher with a built-in booster heater so you can lower the thermostat on your water heater and still get good results. ([PopularMechanics](#))
- Wash full loads of dishes only. ([PopularMechanics](#))
- *Scrape*, don't rinse, off large food pieces and bones. Soaking or pre-washing is generally only recommended in cases of burned-on or dried-on food. ([EERE](#))
- Avoid using the "rinse hold" on your machine for just a few soiled dishes. It uses 3 to 7 gallons of hot water each time you use it. ([EERE](#))
- If you have to wash off your dishes before putting them into the dishwasher, use cold water instead of hot.
- Be sure your dishwasher is loaded properly and not overloaded. ([BG&E](#))



- When shopping for a new dishwasher or other appliances, look for the Energy Star label. Energy Star dishwashers use less water and 41% less energy than required by federal standards. ([EERE](#))

Refrigeration: 8% of energy consumption

- Check the seal on your refrigerator door. If you can close the door on a dollar bill and pull the bill out without resistance, then the door seal is worn and should be replaced. ([PopularMechanics](#))
- Set refrigerator temperatures so the freezer compartment is between 0°F and 5°F, and the main refrigerator is between 37° and 40°F. ([PopularMechanics](#))
- Cover liquids and wrap foods stored in the refrigerator. Uncovered foods release moisture and make the compressor work harder. ([EERE](#))
- Move your refrigerator to a cooler place if it's in direct sunlight or next to the stove to prevent it from working harder to keep cool. ([ACEEE](#))
- Let hot foods cool before placing them in the refrigerator. ([ACEEE](#))
- Thaw frozen food in the refrigerator, not on the countertop. The frozen items help cool the refrigerator as they defrost. ([PopularMechanics](#))
- Keep freezers as full as possible. This prevents the refrigerators from using extra energy to keep the inside cool. ([EERE](#))



Other: 8% of energy consumption

Cooking:

- When using your oven to cook a timed meal, turn the oven off a few minutes before the timer goes off. The heat already generated will continue to cook your food.
- During the winter, after using the oven, leave the door open slightly so that the extra heat will disperse into the room instead of slowly cooling in the oven.
- When cooking on the stovetop, match the size of the pan or pot to the right sized burner. Using a burner that is too big can waste heat.

Landscaping:



- Reduce your air conditioning costs by planting shade trees and shrubs around your house, especially on the west and south sides. Strategically planting trees and shrubs to shade your home can lower surrounding air temperatures by up to 9°F during summer months and can reduce wall and roof temperatures by 20 to 40°F. Utilize deciduous trees, which provide shade in the summer, but allow sun in winter months.

Professional Energy Audit:

To find a professional in your area who will perform an energy audit, begin by asking your local utility company. The cost may range from \$50-\$200, but some companies reduce the cost, or do it free if you allow them to make improvements to your home. Audits may take two to three hours to complete.

BG&E will perform a “Quick Home Energy Check-up” for \$40, which involves a one-hour walkthrough of your home to identify areas where you are wasting energy. The \$40 fee can be waived if you allow BG&E to install at least three of their energy-saving measures. Additionally, the cost and installation of the energy-saving measures will be waived as well. To find out more information, visit the BG&E website and search for “Quick Home Energy Check-up.”

Other professional energy audits may include the following:

Combustion Analyzer: Checks the safety and efficiency of combustion equipment (gas furnace, boiler, water heater)

Draft, Flue and Spillage Test: A safety test to ensure combustion equipment is operating correctly.



Infrared Camera: Identifies air leaks, moisture and insulation voids through thermal imaging.

Pressure Pan: Duct leakage diagnostic tool used with Blower Door and pressure gauge to identify exterior air leakage in duct systems.

Manometer: Measures the pressure of the home, or the leakiness of the house and specific rooms or areas.

Professional Energy Audit information source: [Ardently Green](#)

Blower Door Test: Used to determine your home’s air tightness. Can be used before and after insulation of your home is completed to determine if there is a significant change in the amount of leaking air.



Source: [How Stuff Works, 2008.](#)

Post Energy Audit:

After you have made some improvements, revisit your audit steps in a month or two. Get out your energy bills, and compare. Did your usage drop? Consider going back through the steps above, looking for any appliances or areas you missed before.

Special Notes:

- **Be sure to install and test smoke alarms on all levels of your home.**
- **Install and test carbon monoxide detectors in your furnace room, kitchen, and sleeping areas.**

Sources Used:

Bach, David. *Go Green, Live Rich: 50 Simple Ways to save the Earth and Get Rich Trying*. New York: Broadway, 2008.

Hutchinson, Alex. "Smart Strategies & New Tech for Boosting Home Energy Efficiency." *Popular Mechanics*. Web. 1 Apr. 2010.
<<http://www.popularmechanics.com/home/4217023>>.

Watson, Stephanie. "How Home Energy Audits Work." *How Stuff Works*. Web. 15 Apr. 2010. <<http://home.howstuffworks.com/home-improvement/energy-efficiency/home-energy-audit2.htm>>.

"Efficient Water Heating." *ACEEE - American Council for an Energy-Efficient Economy*. Web. 15 Apr. 2010.
<<http://www.aceee.org/consumerguide/waterheating.htm>>.

"ENERGY SAVERS BOOKLET: Tips on Saving Energy & Money at Home." U.S. Department of Energy.
<http://www1.eere.energy.gov/consumer/tips/pdfs/energy_savers.pdf>.

"Four Steps to Making a Green Difference in Your Home." *Ardently Green Home*. Ardent Home Services. Web. 19 Apr. 2010.
<<http://www.ardentlygreen.com/FourArdentlyGreenSteps.html#knowledge>>.

"Frequently Asked Questions (FAQs) : ENERGY STAR." *Home : ENERGY STAR*. Web. 19 Apr. 2010.
<http://www.energystar.gov/index.cfm?c=power_mgt.pr_power_mgt_faq>.

"Garage Door Insulation Kit." *Radiant Barrier Reflective Foil Insulation, Energy Efficient Products and Information*. Web. 15 Apr. 2010.
<<http://www.energyefficientsolutions.com/garagedoorkit.asp>>.

"High Energy Bills Aren't Cool." *Welcome to CPS Energy*. Web. 15 Apr. 2010.
<http://www.cpsenergy.com/Residential/Energy_Efficiency/Energy_Audits/HVAC_Audit/index.asp>.

Simple Steps to Saving Energy. BG&E. 15 Apr. 2010.
<<http://www.bge.com/vcmfiles/BGE/Files/Energy%20Management/BGESimpleSteps.pdf>>.