Energy Efficiency

Buildings account for almost 40% of all energy use in the United States. Reducing energy consumption with more efficient materials and power saving techniques saves money and lessens our impact on the environment.

The first step to understanding energy efficiency is to determine current energy use. Performing an energy audit will allow you to establish a base line to which improvements can be made. You can schedule an energy audit with an expert, or learn how to conduct your own by visiting the Home Energy Saver website http://hes.lbl.gov. (A directory of available energy audit services by state is available at http://www.natresnet.org/directory/raters.aspx).

Improvements should address:

- Heating and Cooling (Air conditioning accounts for 45% of peak demand energy use)
- High Performing Appliances and Water Conservation
- Lighting (accounts for 33% of commercial energy use at peak demand)
- Insulation

<u>Heating and Cooling</u>

- Assess your heating and cooling systems. Determine if replacements are justified, or whether you should retrofit them to make them work more efficiently to provide the same comfort (or better) for less energy. (See http://www.aceee.org/consumerguide/heating.htm)
- Clean or replace furnace, air-conditioner, and heat-pump filters.
- Make your waterbed. The covers will insulate it, and save up to one-third of the energy it uses.
- Check water heater insulation, add water heater blanket if insulation is closer to fiberglass than foam.
- Insulate hot water pipes and ducts wherever they run through unheated areas.
- Turn down the temperature of your water heater to the warm setting (120°F).
- Set your thermostat back (forward) when you can accept cooler (warmer) conditions. This generally includes night time and whenever you leave your home for several hours. (ENERGY STAR programmable thermostat will automatically adjust the thermostat based on your time-of-day instructions.) The cost can be $25 to $150, and it could cut your HVAC costs about 30%.
- "Tune-up" your HVAC system with an annual maintenance contract. Duct sealing can also improve the energy efficiency and overall performance of your system (warm-air furnace and central air conditioners).
- Regularly change (or clean if reusable) the HVAC filters with your own "do-it-yourself" labor for a high "return-on-investment." During peak cooling or heating season, change or clean your filters every month; they cost about $2-3 each. Dirty filters can cost up to $5 a month extra, overwork the equipment, and result in dirtier indoor air. Consider purchasing "electrostatic" filters, which are washable, long lasting, and provide cleaner air. Clean or change filters more often if smokers or pollution sources are present.
- Use fans. Moving air can make a somewhat higher temperature and/or humidity feel comfortable. Each degree of higher temperature can save about 3% on cooling costs. Ceiling fans can be reversed in the winter, and on low speed will pull warmer air down from the ceiling.

Energy Efficiency

Appliances

- Replace aging, inefficient appliances. Even if the appliance has a few useful years left, replacing it with a top-efficiency model is generally a good investment.
- Start using energy-saving settings on refrigerators, dishwashers, washing machines, and clothes dryers.
- Buy ENERGY STAR labeled office equipment, and other products, when needed, and be sure the "stand-by mode" or “sleep” function(s) are activated.

Lighting

- Survey your incandescent lights for opportunities to replace them with compact fluorescents (CFLs). CFLs cost about 75% less to operate, and last about 10 times longer. The best targets are 60-100W bulbs used several hours a day.
- Install LED (light-emitting diode) exit signs. Your current fixture may accept a simple, "screw-in" lighting element to replace the small incandescent bulbs that burn out with frustrating frequency. This string of LEDs will cost about $15 to $20, will last decades, give brighter light, and end risky ladder climbing to replace bulbs. If your current exit sign will not accept the screw-in lighting element, a new LED exit sign fixture costs about $100, and will still save about 90% over incandescent bulbs' operating costs.
- Turn off lights and equipment when they are not in use. Seems obvious, but high utility costs often include paying for energy that is completely wasted.
- Install "occupant sensors" in the proper locations to automatically turn off lighting when no one is present, and back on when they return. Sensors add convenience as well as save money. But, even good equipment can be installed wrong, so don't install the sensor behind a coat rack, door, or book case. It must be able to "see" the motion of occupant approaching an unlit area to turn on the light before, or as they enter.
- Adjust lighting to your actual needs; use free "daylighting." This means turn off or dim your lights when daylight is adequate, or use automatic "daylight dimming" ballasts/controls to do this for you. To prevent computer screen glare, eyestrain, and headaches, use limited "task lighting" and do not "over-light" the area. Too much light can be as bad for visual quality as too little light — and it costs a lot more.
- Control direct sun through windows. During cooling season, block direct heat gain from the sun shining through glass on the East, and especially West sides of the building. Depending on your situation, there are several options such as "solar screen," "solar film," awnings, and vines. Over time, trees can attractively shade the glass and building. Interior curtains or drapes can help, but it's best to prevent the summer heat from getting past the glass and inside. During heating season, with the sun low in the South, unobstructed Southern windows can contribute heat gain during the day, but should be covered at night.

Insulation

- Seal up the largest air leaks in your house or office. The worst culprits are usually not windows and doors, but utility cut-throughs for pipes ("plumbing penetrations"), gaps around chimneys and recessed lights in insulated ceilings, and unfinished spaces behind cupboards and closets. Better yet, hire an energy auditor with a blower door to point out where the worst cracks are. All the little, invisible cracks and holes may add up to as much as an open window or door, without you ever knowing it.
- Upgrade leaky windows. It may be time to replace them with energy-efficient models or to boost their efficiency with weather-stripping and storm windows.

- Insulate. If your walls aren't insulated have an insulation contractor blow cellulose into the walls. Crawl into your attic or crawlspace and inspect for insulation.
- Plug the leaks with weather-stripping and caulking; another cheap "do-it-yourself" job. Caulking and weather-stripping let you manage your ventilation, which is the desirable, deliberately controlled exchange of stuffy inside air for fresher outdoor air. Most commercial buildings require 15-20 cubic feet per minute (CFM) ventilation per person for healthy indoor air. Uncontrolled "leaking" or exchange of inside air through cracks around windows, doors, utility switches/outlets, and any other holes between the inside and outside can make heating or cooling a building very expensive, and still leave it uncomfortable.