

ENERGY SAVERS

**Tips on Saving
Energy & Money
at Home**



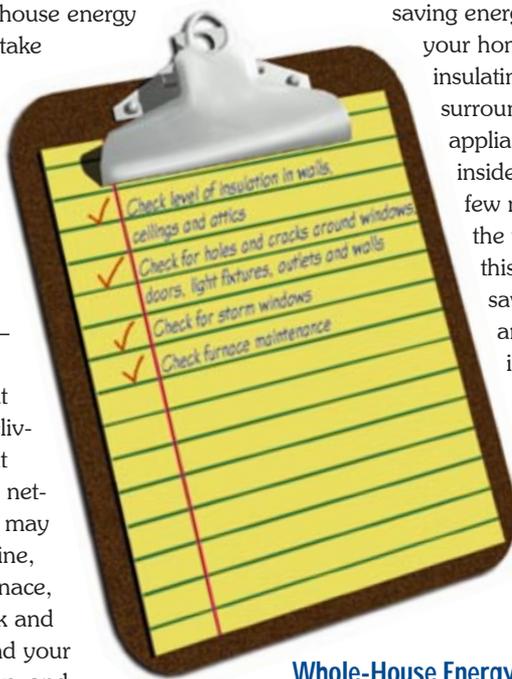
Introduction

Did you know that the average U.S. family spends close to \$1300 a year on their home's utility bills? Unfortunately, a large portion of that energy is wasted. The amount of energy wasted just through poorly insulated windows and doors is about as much energy as we get from the Alaskan pipeline each year. And electricity generated by fossil fuels for a single home puts more carbon dioxide into the air than the average car. By using a few inexpensive energy-efficient measures, you can reduce your energy bills by 10% to 50% and, at the same time, help reduce air pollution.

The key to achieving these savings is a whole-house energy efficiency plan. To take a whole-house approach, view your home as an energy system with interdependent parts. For example, your heating system is not just a furnace—it's a heat-delivery system that starts at the furnace and delivers heat throughout your home using a network of ducts. You may have a top-of-the-line, energy-efficient furnace, but if the ducts leak and are uninsulated, and your walls, attic, windows, and doors are uninsulated, your energy bills will remain high. Taking a whole-house approach to saving energy ensures that dollars you invest in energy efficiency are wisely spent.

Energy-efficient improvements not only make your home more comfortable, they can yield long-term financial rewards. Reduced operating costs more than make up for the higher price of energy-efficient appliances and improvements over their lifetimes. Improvements may also qualify you for an energy efficiency mortgage, which allows lenders to use a higher-than-normal debt-to-income ratio to calculate loan potential. In addition, your home will likely have a higher resale value.

This booklet shows you how easy it is to reduce your home energy use. It is a guide to easy, practical solutions for saving energy throughout your home, from the insulating system that surrounds it to the appliances and lights inside. Please, take a few moments to read the valuable tips in this booklet that will save you energy and money and, in many cases, help the environment by reducing pollution and conserving our natural resources.



Whole-House Energy Plan

Prioritize your whole-house plan by viewing your home as an energy system with interdependent parts.

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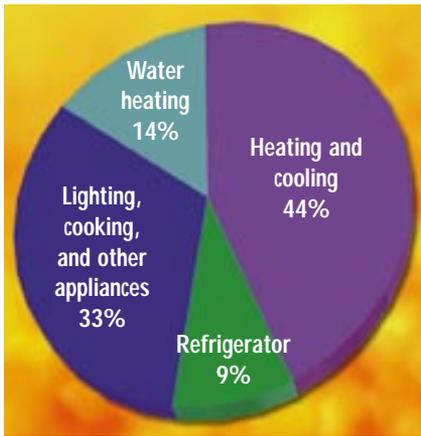
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The U.S. Department of Energy (DOE) works to ensure secure, reliable, and affordable energy supplies that support a growing economy and protect the environment and public health. Energy efficiency improvements and tips are easy ways for Americans to do their part for the nation's energy security — while saving on energy bills.

A special thank you to Owens Corning for printing this booklet and for participating in DOE's Energy Awareness Month Campaign.

Your Home's Energy Use

The first step to taking a whole-house energy efficiency approach is to find out which parts of your house use the most energy. A home energy audit will show you where these are and suggest the most effective measures for reducing your energy costs. You can conduct a simple home energy audit yourself, you can contact your local utility, or you can call an independent energy auditor for a more comprehensive examination.



How We Use Energy In Our Homes (based on national averages)

The largest portion of a utility bill for a typical house is for heating and cooling.

Energy Auditing Tips

- Check the level of insulation in your exterior and basement walls, ceilings, attic, floors, and crawl spaces.
- Check for holes or cracks around your walls, ceilings, windows, doors, light and plumbing fixtures, switches, and electrical outlets that can leak air into or out of your home.
- Check for open fireplace dampers.

- Make sure your appliances and heating and cooling systems are properly maintained.
- Study your family's lighting needs and use patterns, paying special attention to high-use areas such as the living room, kitchen, and exterior lighting. Look for ways to use daylighting, reduce the time the lights are on, and replace incandescent bulbs and fixtures with compact fluorescent lamps or standard fluorescent lamps.

Formulating Your Plan

After you have identified places where your home is losing energy, assign priorities to your energy needs by asking yourself a few important questions:

- How much money do you spend on energy?
- Where are your greatest energy losses?
- How long will it take for an investment in energy efficiency to pay for itself in energy savings?
- Can you do the job yourself, or will you need to hire a contractor?
- What is your budget and how much time do you have to spend on maintenance and repair?

Once you assign priorities to your energy needs, you can form a whole-house efficiency plan. Your plan will provide you with a strategy for making smart purchases and home improvements that maximize energy efficiency and save the most money.

Another option is to get the advice of a professional. Many utilities conduct energy audits for free or for a nominal charge. For a fee, a professional contractor will analyze how your home's energy systems work together as a system and

compare the analysis against your utility bills. He or she will use a variety of equipment such as blower doors, infrared cameras, and surface thermometers to find inefficiencies that cannot be detected by a visual inspection. Finally, they will give you a list of recommendations for cost-effective energy improvements and enhanced comfort and safety.

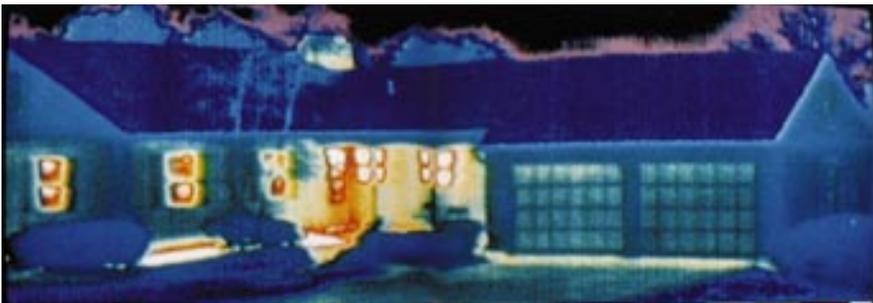
For more information about home energy audits, contact:

**U.S. Department of Energy's (DOE's)
Energy Efficiency and Renewable Energy
Clearinghouse (EREC),**
(800) DOE-EREC (363-3732), www.eren.doe.gov

Finding a contractor

When searching for a contractor, you should:

- Start with the Yellow Pages
- Focus on local companies
- Look for licensed, insured contractors
- Get three bids with details in writing
- Ask about previous experience
- Check references
- Inquire with the Better Business Bureau



Cool  Hot

Heat Loss from a House

A picture is worth..., in this case, lost heating dollars. This thermal photograph shows heat leaking from a house during those expensive winter heating months. The white, yellow, and red colors show where the heat escapes, with the red representing the area of the greatest heat loss.

Thermogram/photograph copyright 1997, Infraspection Institute, Inc., Shelburne, VT

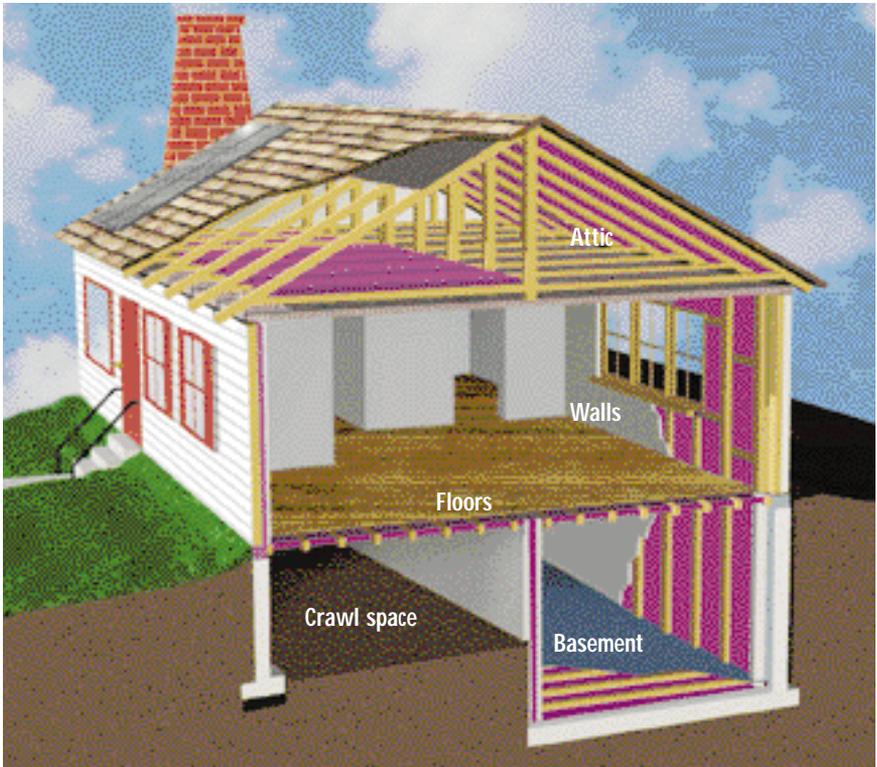
Insulation and Weatherization

Checking your home's insulating system is one of the fastest and most cost-efficient ways to use a whole-house approach to reduce energy waste and maximize your energy dollars. A good insulating system includes a combination of products and construction techniques that provide a home with thermal performance, protect it against air infiltration, and control moisture. You can increase the comfort of your home while reducing your heating and cooling needs by up to 30% by investing just a few hundred

dollars in proper insulation and weatherization products.

Insulation

First, check the insulation in your attic, ceilings, exterior and basement walls, floors, and crawl spaces to see if it meets the levels recommended for your area. Insulation is measured in R-values—the higher the R-value, the better your walls and roofs will resist the transfer of heat. The U.S. Department of Energy (DOE) recommends ranges of R-values based on local heating and cooling costs and



Where to Insulate

Adding insulation in the areas shown here may be the best way to improve your home's energy efficiency.

climate conditions in different areas of the nation. The map and chart on pages 6 and 7 show the DOE recommendations for your area. State and local codes in some parts of the country may require lower R-values than the DOE recommendations, which are based on cost-effectiveness.

Although insulation can be made from a variety of materials, it usually comes in four types—batts, rolls, loose-fill, and rigid foam boards. Each type is made to fit in a different part of your house. Batts are made to fit between the studs in your walls or between the joists of your ceilings or floors. Batts are usually made of fiber glass or rock wool. Fiber glass is manufactured from sand and recycled glass, and rock wool is made from basaltic rock and recycled material from steel mill wastes. Rolls or blankets are also usually made of fiber glass and can be laid over the floor in the attic. Loose-fill insulation, usually made of fiber glass, rock wool or cellulose, is blown into the attic or walls. Cellulose is made from recycled materials treated with fire-retardant chemicals.

Rigid foam boards are made of polyisocyanurate, extruded polystyrene (XPS or blueboard), expanded polystyrene (EPS or beadboard), or other materials. These boards are lightweight, provide structural support, and generally have an R-value of 4 to 7 per inch. Rigid board insulation is made to be used in confined spaces such as exterior walls, basements, foundation and stem walls, concrete slabs, and cathedral ceilings.

Insulation Tips

- Consider factors such as your climate, building design, and budget when selecting insulation R-value for your home.
- Use higher density insulation, such as rigid foam boards, in cathedral ceilings and on exterior walls.

Should I insulate my home?

The answer is probably “yes” if you:

- Have an older home and haven’t added insulation: in a recent survey, only 20% of homes built before 1980 were well insulated;
 - Are uncomfortably cold in the winter or hot in the summer—adding insulation creates a more uniform temperature and increases comfort;
 - Build a new house or addition, or install new siding or roofing;
 - Pay excessive energy bills;
 - Are bothered by noise from the outdoors—insulation helps to muffle sound;
 - Are concerned about the effect of energy use on the environment.
- Ventilation plays a large role in providing moisture control and reducing summer cooling bills. Install attic vents to help make sure that there is one inch of ventilation space between the insulation and roof shingles. Attic vents can be installed along the entire ceiling cavity to help ensure proper airflow from the soffit to the attic, helping to make a home more comfortable and energy efficient.
 - Do not block vents with insulation, and keep insulation at least 3 inches away from recessed lighting fixtures or other heat-producing equipment unless it is marked “I.C.”—designed for direct insulation contact.
 - As specified on the product packaging, follow the product instructions on installation and wear the proper protective gear when installing insulation.
- The easiest and most cost-effective way to insulate your home is to add insulation in the attic. To find out if you have enough attic insulation, measure the thickness of insulation. If there is less than

R-19 (6 inches of fiber glass or rock wool or 5 inches of cellulose) you could probably benefit by adding more. Most U.S. homes should have between R-19 and R-49 insulation in the attic.

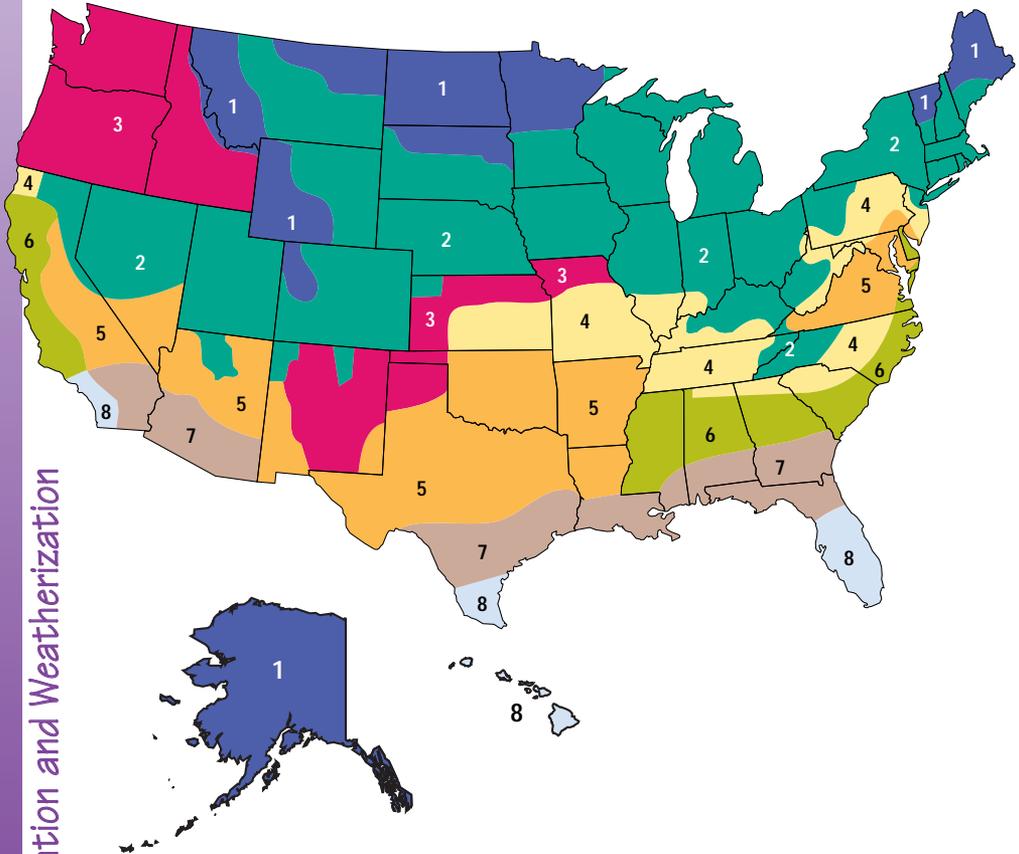
If your attic has ample insulation and your home still feels drafty and cold in the winter or too warm in the summer, chances are you need to add insulation to the exterior walls as well. This is a more expensive measure that usually requires

a contractor, but it may be worth the cost if you live in a very hot or cold climate.

New Construction

For new construction or home additions, R-19 insulation for exterior walls is recommended for most of the country. To meet this recommendation, most homes and additions constructed with 2 x 4 walls require a combination of wall cavity insulation, such as batts, and

U.S. Department of Energy Recommended Total R-Values for Existing Houses in Eight Insulation Zones^(a)



insulating sheathing, such as rigid foam boards. You may want to consider building with 2 x 6 framing instead of 2 x 4 framing to allow room for thicker wall cavity insulation—R-19 to R-21.

When shopping for insulation watch for the ENERGY STAR® label and the National Association of Home Builders (NAHB) certification.

Weatherization

Warm air leaking into your home during the summer and out of your home during the winter can waste a substantial portion of your energy dollars. One of the quickest dollar-saving tasks you can do is caulk, seal, and weatherstrip all seams, cracks, and openings to the outside. You can save 10% or more on your energy bill by reducing the air leaks in your home.

Insulation zone	Ceilings below ventilated attics		Floors over unheated crawl spaces, basements		Exterior walls ^(b) (wood frame)		Crawl space walls ^(c)	
	Gas, oil, or heat pump	Electric resistance	Gas, oil, or heat pump	Electric resistance	Gas, oil, or heat pump	Electric resistance	Gas, oil, or heat pump	Electric resistance
1	49	49	19	19	11	11	19	19
2	38	49	19	19	11	11	19	19
3	38	38	19	19	11	11	19	19
4	38	38	19	19	11	11	19	19
5	30	38	19	19	11	11	19	19
6	30	38	(d)	19	11	11	19	19
7	30	30	(d)	(d)	11	11	19	19
8	19	30	(d)	(d)	(d)	11	11	11

- (a) These recommendations are based on the assumption that no structural modifications are needed to accommodate the added insulation.
- (b) For new construction, R-19 is recommended for exterior walls. Jamming an R-19 batt into a 3-1/2-inch cavity will not yield R-19 because compression reduces the R-value.
- (c) Insulate crawl space walls only if the crawl space is dry all year, the floor above is not insulated, and all ventilation to the crawl space is blocked. A vapor barrier (e.g., 4- or 6-mil polyethylene film) should be installed on the ground to reduce moisture migration into the crawl space.
- (d) Thermal response of existing space for cooling benefits does not suggest additional insulation.



Sources of Air Leaks in Your Home

Areas that leak air into and out of your home cost you lots of money. Check the culprit areas listed here:

- | | | | | | |
|---|------------------------------------|----|-------------------------|----|----------------------------------|
| 1 | Dropped ceiling | 6 | Water and furnace flues | 11 | Window sashes and frames |
| 2 | Recessed light | 7 | All ducts | 12 | Baseboards, coves, interior trim |
| 3 | Attic entrance | 8 | Door sashes and frames | 13 | Plumbing access panel |
| 4 | Electric wires and box | 9 | Chimney penetration | 14 | Electrical outlets and switches |
| 5 | Plumbing utilities and penetration | 10 | Warm air register | 15 | Light fixtures |

Weatherization Tips

- First, test your home for air tightness. On a windy day, hold a lit incense stick next to your windows, doors, electrical boxes, plumbing fixtures, electrical outlets, ceiling fixtures, attic hatches, and other locations where there is a possible air path to the outside. If the smoke stream travels horizontally, you have located an air leak that may need caulking, sealing, or weatherstripping.
- Caulk and weatherstrip doors and windows that leak air.
- Caulk and seal air leaks where plumbing, ducting, or electrical wiring penetrates through exterior walls, floors, ceilings, and soffits over cabinets.

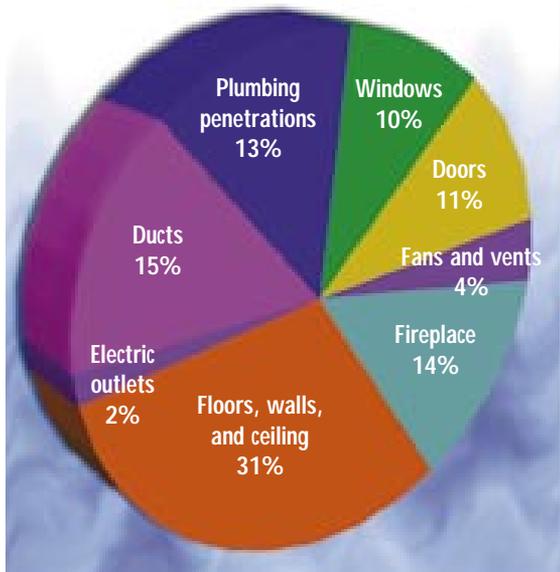
- Install rubber gaskets behind outlet and switch plates on exterior walls.
- Look for dirty spots in your insulation, which often indicate holes where air leaks into and out of your house. You can seal the holes by stapling sheets of plastic over the holes and caulking the edges of the plastic.
- Install storm windows over single-pane windows. Storm windows as much as double the R-value of single-pane windows and they can help reduce drafts, water condensation, and frost formation. As a less costly and less permanent alternative, you can use a heavy-duty, clear plastic sheet on a frame or tape clear plastic film to the inside of your window frames during the cold winter months. Remember, the plastic must be sealed tightly to the frame to help reduce infiltration.
- When the fireplace is not in use, keep the flue damper tightly closed. A chimney is designed specifically for smoke to escape, so until you close it, warm air escapes— 24 hours a day!
- For new construction, reduce exterior wall leaks by either installing house wrap, taping the joints of exterior sheathing, or comprehensively caulking and sealing the exterior walls.

For more information on insulation, weatherization, and ventilation, contact:

Cellulose Insulation Manufacturers Association (CIMA), (937) 222-2462, www.cellulose.org

ENERGY STAR®, (888) STAR-YES (782-7937), www.energystar.gov

Insulation Contractors Association of America (ICAA), (703) 739-0356, www.insulate.org



How Does the Air Escape?

Air infiltrates in and out of your home through every hole, nook, and cranny. About one third of this air infiltrates through openings in your ceilings, walls, and floors.

National Association of Home Builders (NAHB), (800) 368-5242, www.nahb.com

North American Insulation Manufacturers Association (NAIMA), (703) 684-0084, www.naima.org

Owens Corning Customer Service Hotline, (800) GET-PINK (438-7465), www.owenscorning.com

Polyisocyanurate Insulation Manufacturers Association (PIMA), (202) 624-2709, www.pima.org

U.S. Department of Energy's Energy Efficiency and Renewable Energy Clearinghouse (EREC), (800) DOE-EREC (363-3732), www.eren.doe.gov

Heating and Cooling

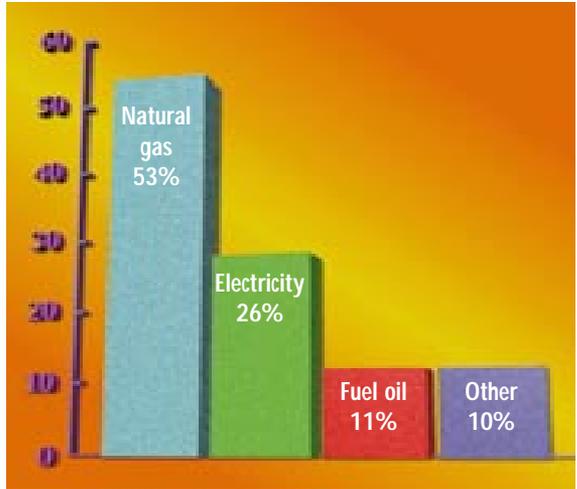
Heating and cooling your home uses more energy and drains more energy dollars than any other system in your home. Typically, 44% of your utility bill goes for heating and cooling. What's more, heating and cooling systems in the United States together emit over a half billion tons of carbon dioxide into the atmosphere each year, adding to global warming. They also generate about 24% of the nation's sulfur dioxide and 12% of the nitrogen oxides, the chief ingredients in acid rain.

No matter what kind of heating, ventilation, and air-conditioning system you have in your house, you can save money and increase comfort by properly maintaining and upgrading your equipment. But remember, an energy-efficient furnace alone will not have as great an impact on your energy bills as using the whole-house approach. By combining proper equipment maintenance and upgrades with appropriate insulation, weatherization, and thermostat settings, you can cut your energy bills and your pollution output in half.

Heating Tips

- Set your thermostat as low as is comfortable.
- Clean or replace filters on furnaces once a month or as needed.
- Clean warm-air registers, baseboard heaters, and radiators as needed; make sure they're not blocked by furniture, carpeting, or drapes.

- Bleed trapped air from hot-water radiators once or twice a season; if in doubt about how to perform this task, call a professional.
- Place heat-resistant radiator reflectors between exterior walls and the radiators.



Household Heating Systems

Although there are several different types of fuels available to heat our homes, about half of us use natural gas.

- Use kitchen, bath, and other ventilating fans wisely; in just 1 hour, these fans can pull out a houseful of warmed or cooled air. Turn fans off as soon as they have done the job.
- Keep draperies and shades open on south-facing windows during the heating season to allow sunlight to enter your home; close them at night to reduce the chill you may feel from cold windows.

What's a Btu?

One Btu, or British thermal unit, is roughly equivalent to burning one kitchen match. That may not sound like much, but a typical home consumes about 100 million Btus per year. Approximately one-half of the total is used for space heating.

- Close an unoccupied room that is isolated from the rest of the house, such as in a corner, and turn down the thermostat or turn off the heating for that room or zone. However, do not turn the heating off if it adversely affects the rest of your system. For example, if you heat your house with a heat pump, do not close the vents—closing the vents could harm the heat pump.
- Select energy-efficient equipment when you buy new heating equipment. Your contractor should be able to give you energy fact sheets for different types, models, and designs to help you compare energy usage. Look for the ENERGY STAR® label. The ENERGY STAR® is a program of the U.S. Department of Energy (DOE) and the Environmental Protection Agency (EPA) designed to help consumers identify energy-efficient appliances and products.

Ducts

One of the most important systems in your home, though it's hidden beneath your feet and over your head, may be wasting a lot of your energy dollars. Your home's duct system, a branching network of tubes in the walls, floors, and ceilings, carries the air from your home's furnace and central air conditioner to each room. Ducts are made of sheet metal, fiber glass, or other materials.

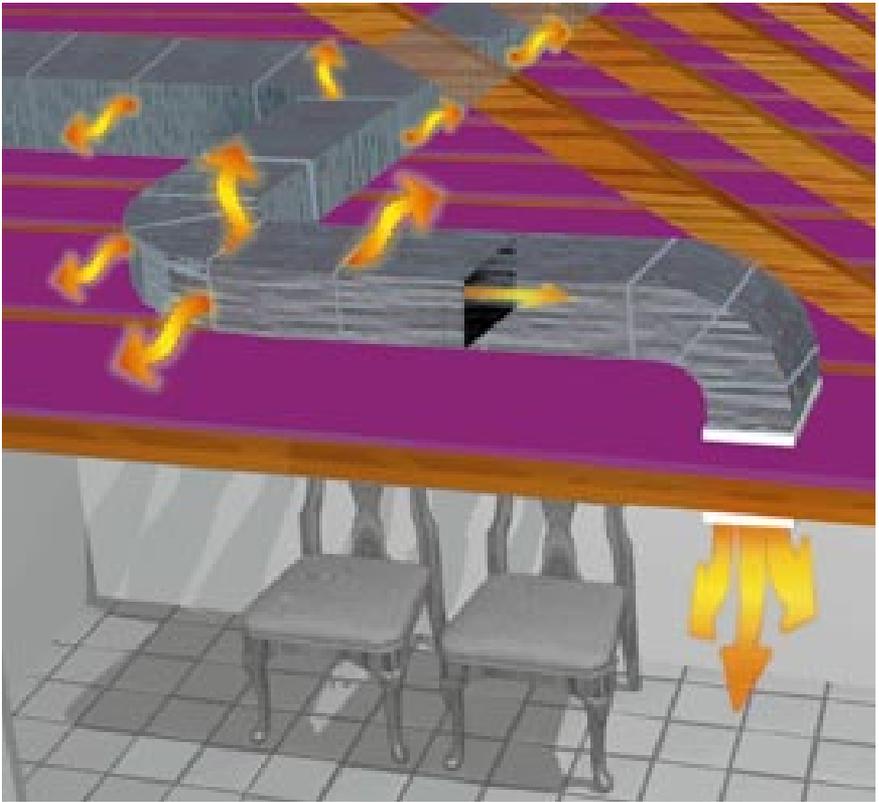
Unfortunately, many duct systems are poorly insulated or not insulated properly. Ducts that leak heated air into unheated spaces can add hundreds of dollars a year to your heating and cooling bills. Insulating ducts that are in unconditioned spaces is usually very cost effective. If you are buying a new duct system, consider one that comes with insulation already installed.

Sealing your ducts to prevent leaks is even more important if the ducts are located in an unconditioned area such as an attic or vented crawl space. If the supply ducts are leaking, heated or cooled air can be forced out unsealed joints and lost. In addition, unconditioned air can also be drawn into return ducts through unsealed joints. In the summer, hot attic air can be drawn in, increasing the load on the air conditioner. In the winter, your furnace will have to work longer to keep your house comfortable. Either way, your energy losses cost you money.

Although minor duct repairs are easy to accomplish, ducts in unconditioned spaces should be sealed and insulated by qualified professionals using the appropriate sealing materials. Here are a few simple tips to help with minor duct repairs.

Duct Tips

- Check your ducts for air leaks. First look for sections that should be joined but have separated and then look for obvious holes.
- If you use duct tape to repair and seal your ducts, look for tape with the Underwriters Laboratories (UL) logo to avoid tape that degrades, cracks, and loses its bond with age.
- Remember that insulating ducts in the basement will make the basement



Ducts—Out of Sight, Out of Mind

The unsealed ducts in your attics and crawl spaces lose air — uninsulated ducts lose heat, wasting energy and money.

- colder. If both the ducts and the basement walls are uninsulated, consider insulating the basement walls and the ducts.*
- If your basement has been converted to a living area, install both supply and return registers in the basement rooms.
- Be sure a well-sealed vapor barrier exists on the outside of the insulation

*Note: Water pipes and drains in unconditioned spaces could freeze and burst in the space if the heat ducts are fully insulated, because there would be no heat source to prevent the space from freezing in cold weather. However, using an electric heating tape wrap on the pipes can prevent this.

on cooling ducts to prevent moisture buildup.

- Get a professional to help you insulate and repair all ducts.

Heat Pumps

If you use electricity to heat your home, consider installing an energy-efficient heat pump system. Heat pumps are the most efficient form of electric heating in moderate climates, providing three times more heating than the equivalent amount of energy they consume in electricity. There are three types of heat pumps: air-to-air, water source, and ground source. They collect heat from

the air, water, or ground outside your home and concentrate it for use inside. Heat pumps do double duty as a central air conditioner. They can also cool your home by collecting the heat inside your house and effectively pumping it outside. A heat pump can trim the amount of electricity you use for heating as much as 30% to 40%.

Heat Pump Tips

- Do not set back the heat pump's thermostat manually if it causes the electric resistance heating to come on. This type of heating, which is often used as a backup to the heat pump, is more expensive.
- Clean or change filters once a month or as needed, and maintain the system according to manufacturer's instructions.

Solar Heating

Using the sun to heat your home through passive solar design can be both environmentally friendly and cost effective. In many cases, you can cut your heating costs by more than 50% compared to the cost of heating the same house that does not include passive solar design. Passive solar design techniques include placing larger, insulated windows on south-facing walls and locating thermal mass, such as a concrete slab floor or a heat-absorbing wall, close to the windows. However, a passive solar house requires careful design, best done by an architect for new construction or major remodeling.

Solar Tips

- Keep all south-facing glass clean.
- Make sure that objects do not block the sunlight shining on concrete slab floors or heat-absorbing walls.

- Consider using insulating curtains to reduce excessive heat loss from large windows at night.

Fireplaces

When you cozy up next to a crackling fire on a cold winter day, you probably don't realize that your fireplace is one of the most inefficient heat sources you can possibly use. It literally sends your energy dollars right up the chimney along with volumes of warm air. A roaring fire can exhaust as much as 24,000 cubic feet of air per hour to the outside, which must be replaced by cold air coming into the house from the outside. Your heating system must warm up this air, which is then exhausted through your chimney. If you use your conventional fireplace while your central heating system is on, these tips can help reduce energy losses.

Fireplace Tips

- If you never use your fireplace, plug and seal the chimney flue.
- Keep your fireplace damper closed unless a fire is going. Keeping the damper open is like keeping a 48-inch window wide open during the winter; it allows warm air to go right up the chimney.
- When you use the fireplace, reduce heat loss by opening dampers in the bottom of the firebox (if provided) or open the nearest window slightly—approximately 1 inch—and close doors leading into the room. Lower the thermostat setting to between 50° and 55°F.
- Install tempered glass doors and a heat-air exchange system that blows warmed air back into the room.
- Check the seal on the flue damper and make it as snug as possible.

- Add caulking around the fireplace hearth.
- Use grates made of C-shaped metal tubes to draw cool room air into the fireplace and circulate warm air back into the room.

Gas and Oil Heating Systems

If you plan to buy a new heating system, ask your local utility or state energy office for information about the latest technologies available to consumers. They can advise you about more efficient systems on the market today. For example, many newer models incorporate designs for burners and heat exchangers that result in higher efficiencies during operation and reduce heat loss when the equipment is off. Check the appliance card in the back of this booklet for additional information on how to understand heating system ratings.

Look for the ENERGY STAR® label.

Air Conditioners

It might surprise you to know that buying a bigger room air-conditioning unit won't necessarily make you feel more comfortable during the hot summer months. In fact, a room air conditioner that's too big for the area it is supposed to cool will perform less efficiently and less effectively than a smaller, properly sized unit. This is because room units work better if they run for relatively long periods of time than if they are continually, switching off and on. Longer run times allow air conditioners to maintain a more constant room temperature. Running longer also allows them to remove a larger amount of moisture from the air, which lowers humidity and, more importantly, makes you feel more comfortable.

Sizing is equally important for central air-conditioning systems, which need to be sized by professionals. If you have a

central air system in your home, set the fan to shut off at the same time as the cooling unit (compressor). In other words, don't use the system's central fan to provide circulation, but instead use circulating fans in individual rooms.

Cooling Tips

- Whole-house fans help cool your home by pulling cool air through the house and exhausting warm air through the attic. They are effective when operated at night and when the outside air is cooler than the inside.
- Set your thermostat as high as comfortably possible in the summer. The less difference between the indoor and outdoor temperatures, the lower your overall cooling bill will be.
- Don't set your thermostat at a colder setting than normal when you turn on your air conditioner. It will not cool your home any faster and could result in excessive cooling and, therefore, unnecessary expense.
- Set the fan speed on high except in very humid weather. When it's humid, set the fan speed on low. You'll get better cooling, and slower air movement through the cooling equipment allows it to remove more moisture from the air, resulting in greater comfort.
- Consider using an interior fan in conjunction with your window air conditioner to spread the cooled air more effectively through your home without greatly increasing your power use.
- Don't place lamps or TV sets near your air-conditioning thermostat. The thermostat senses heat from these appliances, which can cause the air conditioner to run longer than necessary.
- Plant trees or shrubs to shade air-conditioning units but not to block the airflow. A unit operating in the shade



Nighttime Heating

Using a programmable thermostat, you can automatically turn down your heat at night or when you are not at home.



Nighttime Cooling

In the summer, you can save money by automatically turning your air-conditioning up at night.

uses as much as 10% less electricity than the same one operating in the sun.

The shopping guide in the back of this booklet will help you find the right size unit for your needs. Look for the ENERGY STAR® label.

Programmable Thermostats

You can save as much as 10% a year on your heating and cooling bills by simply turning your thermostat back 10% to 15% for 8 hours. You can do this automatically without sacrificing comfort by installing an automatic setback or programmable thermostat.

Using a programmable thermostat, you can adjust the times you turn on the heating or air-conditioning according to a pre-set schedule. As a result, you don't operate the equipment as much when you are asleep or when the house or part of the house is not occupied. (These thermostats are not meant to be used

with heat pumps.) Programmable thermostats can store and repeat multiple daily settings (six or more temperature settings a day) that you can manually override without affecting the rest of the daily or weekly program. When shopping for a programmable thermostat, be sure to look for the ENERGY STAR® label.

For more information on heating and cooling, contact:

Air Conditioning and Refrigeration Institute, (703) 524-8800, www.ari.org

ENERGY STAR®, (888) STAR-YES (782-7937), www.energystar.gov

Owens Corning Customer Service Hotline, (800) GET-PINK (438-7465), www.owenscorning.com

U.S. Department of Energy's Energy Efficiency and Renewable Energy Clearinghouse (EREC), (800) DOE-EREC (363- 3732), www.eren.doe.gov/erec/factsheets

Water Heating

Water heating is the third largest energy expense in your home. It typically accounts for about 14% of your utility bill.

There are four ways to cut your water heating bills: use less hot water, turn down the thermostat on your water heater, insulate your water heater, and buy a new, more efficient water heater. A family of four, each showering for 5 minutes a day, uses 700 gallons of water a week; this is enough for a 3-year supply of drinking water for one person. You can cut that amount in half simply by using low-flow showerheads and faucets.

Water Heating Tips

- Repair leaky faucets promptly; a leaky faucet wastes gallons of water in a short period.
- Insulate your electric hot-water storage tank and pipes, but be careful not to cover the thermostat.
- Insulate your gas or oil hot-water storage tank and pipes, but be careful not to cover the water heater's floor, top, thermostat, or burner compartment; when in doubt, get professional help.
- Install aerators in faucets and low-flow showerheads.
- Buy a new water heater with a thick, insulating shell; while it may cost more initially than one without insulation, the energy savings will continue during the lifetime of the appliance.
- Although most water heaters last 10–15 years, it's best to start shopping for a new one if yours is more than 7 years old. Doing some research before your heater fails will enable you to select one that most appropriately meets your needs.
- Lower the thermostat on your water heater; water heaters sometimes come from the factory with high temperature settings, but a setting of 115°F provides comfortable hot water for most uses.
- Drain a quart of water from your water tank every 3 months to remove



Water Heater

Insulate your water heater to save energy and money.

sediment that impedes heat transfer and lowers the efficiency of your heater. The type of water tank you have determines the steps to take, so follow the manufacturer's advice.

- If you heat with electricity and live in a warm and sunny climate, consider installing a solar water heater. The solar units are environmentally friendly and can now be installed on your roof to blend with the architecture of your house.
- Take more showers than baths. Bathing uses the most hot water in the average household. You use 15–25 gallons of hot water for a bath, but less than 10 gallons during a 5-minute shower.

Look for the ENERGY STAR® label.

Solar Water Heaters

If you heat with electricity and you have an unshaded, south-facing location (such as a roof) on your property, consider installing a solar water heater. More than 1.5 million homes and businesses in the United States have invested in solar water heating systems and over 94% of these customers consider the systems a good investment. Solar water heating systems are also good for the environment. Solar water heaters avoid the harmful greenhouse gas emissions associated with electricity production. During a 20 year period, one solar water heater can avoid over 50 tons of carbon dioxide emissions.

When shopping for a solar water heater, watch for systems certified by the Solar Rating and Certification Corporation (SRCC) or the Florida Solar Energy Center (FSEC).

For more information on how you can save money on your water heating bill, contact:



Hot Water Usage (based on national averages)
The typical U.S. homeowners' water consumption by place of use.

American Solar Energy Society (ASES),
(303) 443-3130, www.ASES.org/solar

ENERGY STAR®, (888) STAR-YES (782-7937),
www.energystar.gov

Florida Solar Energy Center (FSEC),
(407) 638-1010, www.fsec.ucf.edu

Owens Corning Customer Service Hotline,
(800) GET-PINK (438-7465),
www.owenscorning.com

Solar Energy Industries Association (SEIA),
(202) 383-2600, www.seia.org

Solar Rating and Certification Corporation (SRCC), (407) 638-1537

U.S. Department of Energy's Energy Efficiency and Renewable Energy Clearinghouse (EREC),
(800) DOE-EREC (363- 3732),
www.eren.doe.gov/erec/factsheets

Windows

Windows can be one of your home's most attractive features. Windows provide views, daylighting, ventilation, and solar heating in the winter. Unfortunately, they can also account for 10% to 25% of your heating bill. During the summer, sunny windows make your air conditioner work two to three times harder. If you live in the Sun Belt, look into new solar control spectrally selective windows, which can cut the cooling load by more than half.

If your home has single-pane windows, as almost half of U.S. homes do, consider replacing them. New double-pane windows with high-performance glass (e.g., low-e or spectrally selective) are available on the market. In colder climates, select windows that are gas filled with low-emissivity (low-e) coatings on the glass to reduce heat loss. In warmer climates, select windows with spectrally selective coatings to reduce heat gain. If you are building a new home, you can offset some of the cost of installing more efficient windows because doing so allows you to buy smaller, less expensive heating and cooling equipment.

If you decide not to replace your windows, the simpler, less costly measures listed below can improve the performance of your windows.

Cold-Climate Window Tips

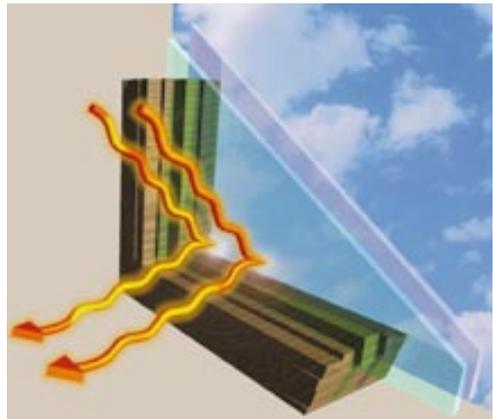
- Install exterior or interior storm windows; storm windows can reduce your heat loss through the windows by 25% to 50%. Storm windows should have weatherstripping at all moveable joints; be made of strong, durable

materials; and have interlocking or overlapping joints. Low-e storm windows save even more energy.

- Repair and weatherize your current storm windows, if necessary.
- Install tight-fitting, insulating window shades on windows that feel drafty after weatherizing.
- Close your curtains and shades at night; open them during the day.
- Keep windows on the south side of your house clean to maximize solar gain.

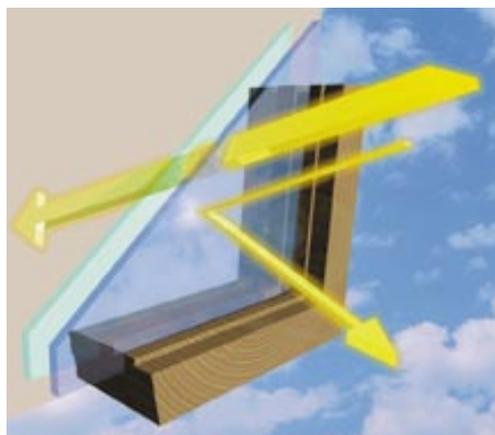
Warm-Climate Window Tips

- Install white window shades, drapes, or blinds to reflect heat away from the house.
- Close curtains on south- and west-facing windows.
- Install awnings on south- and west-facing windows.



Cold-Climate Windows

Double-pane windows with low-e coating on the glass reflect heat back into the room during the winter months.



Warm-Climate Windows

In the summertime, the sun shining through your windows heats up the room. Windows with spectrally selective coatings on the glass reflect some of the sunlight, keeping your rooms cooler.

- Apply sun-control or other reflective films on south-facing windows to reduce solar gain.

Buying New Windows

New windows are long-term investments that have a large impact on your home's energy systems. Today, there are many new window technologies available that are worth considering. Glazing materials now come with a variety of selective coatings and other features; frames are available in aluminum, wood, vinyl, fiber glass, or combinations of these materials. Each type of glazing material and frame has advantages and disadvantages.

Shopping Tips

- When you're shopping for new windows, first, look for the National Fenestration Rating Council (NFRC) label; it means the window's performance is certified.
- Remember, the lower the U-value, the better the insulation. In colder climates, a U-value of 0.35 or below is recommended. These windows have at least double glazing and low-e coating.
- In warm climates, where summertime heat gain is the main concern, look for windows with double glazing and spectrally selective coatings that reduce heat gain.

spectrally selective coatings that reduce heat gain.

- Select windows with air leakage ratings of 0.3 cubic feet per minute or less.
- In temperate climates with both heating and cooling seasons, select windows with both low U-values and low solar heat gain coefficient (SHGC) to maximize energy benefits.

For more information about windows, contact:

American Architectural Manufacturers Association (AAMA), (847) 303-5664, www.aamanet.org

ENERGY STAR®, (888) STAR-YES (782-7937), www.energystar.gov

National Fenestration Rating Council (NFRC), (301) 589-6372, www.nfrc.org

National Wood Window and Door Association, (800) 223-2301, www.nwwda.org

Owens Corning Customer Service Hotline, (800) GET-PINK (438-7465), www.owenscorning.com

U.S. Department of Energy's Energy Efficiency and Renewable Energy Clearinghouse (EREC), (800) DOE-EREC (363-3732), www.eren.doe.gov

Landscaping

Landscaping is a natural and beautiful way to keep your home more comfortable and reduce your energy bills. In addition to adding aesthetic value and environmental quality to your home, a well-placed tree, shrub, or vine can deliver effective shade, act as a wind-break, and reduce overall energy bills.

Carefully positioned trees can save up to 25% of a typical household's energy for heating and cooling. Computer models from DOE predict that just three trees, properly placed around the house, can save an average household between \$100 and \$250 in heating and cooling energy costs annually. During the summer months, the most effective way to keep your home cool is to prevent the heat from building up in the first place. A primary source of heat buildup is

sunlight absorbed by your home's roof, walls, and windows. Dark-colored home exteriors absorb 70% to 90% of the radiant energy from the sun that strikes the home's surfaces. Some of this absorbed energy is then transferred into your home by way of conduction, resulting in heat gain inside the house. In contrast, light-colored surfaces effectively reflect most of the heat away from your home. Landscaping can also help block and absorb the sun's energy to help decrease heat buildup in your home by providing shade and evaporative cooling.

Shading and evaporative cooling from trees can reduce the air temperature around your home. Studies conducted by the Lawrence Berkeley National Laboratory found summer daytime air temperatures to be 3° to 6°F cooler in



Buildings and Trees—Natural Partners

Deciduous trees planted on the south and on the west will help keep your house cool in the summer and allow sun to shine in the windows in the winter.

tree-shaded neighborhoods than in treeless areas. The energy-conserving landscape strategies you should use for your home depend on the type of climate in which you live.

Landscaping Tips—Dependent on Geographic Area

- Trees that lose their leaves in the fall (i.e., deciduous) are the most effective at reducing heating and cooling energy costs. When selectively placed around a house, they provide excellent protection from the summer sun but permit winter sunlight to reach and warm your house. The height, growth rate, branch spread, and shape are all factors to consider in choosing a tree.
- Vines provide shading and cooling. Grown on trellises, vines can shade windows or the whole side of a house.
- Deflect winter winds by planting evergreen trees and shrubs on the north and west sides of your house; deflect summer winds by planting on the south and west sides of your house.

Orientation of the house and surrounding landscaping has a large effect on energy consumption. A well-oriented, well-designed home admits low-angle winter sun to reduce heating bills; rejects overhead summer sun to reduce cooling bills; and minimizes the chill effect of winter winds. Fences, walls, other nearby buildings, and rows of trees or shrubs block or channel the wind. Bodies of water moderate temperature but increase humidity and produce glare. Trees provide shade, windbreaks, and wind channels. Pavement reflects or absorbs heat, depending on whether it is light or dark in color.

White Roofs

Just as wearing white clothes reflects the sun's heat from your body, a white or light-colored roof will help reflect the sun's heat away from your home. This strategy works particularly well when trees are located next to the reflecting surface. Not only does the tree provide shade, it absorbs the reflected sunlight for photosynthesis. In the process, water evaporates from the tree, cooling the air around the

Contact your county extension agents, public libraries, local nurseries, landscape architects, landscape contractors, and state and local energy offices for additional information on energy-efficient landscaping and regional plants and their maintenance requirements.

For more information on landscaping for energy efficiency, contact:

American Forests, (202) 955-4500,
www.amfor.org:80/dirt.html

American Society of Landscape Architects (ASLA), (202) 898-2444, www.asla.org

National Arbor Day Foundation (NADF),
(402) 474-5655, www.arborday.org

U.S. Department of Agriculture, County
Extension Service - Local Chapter

**U.S. Department of Energy's
Energy Efficiency and Renewable Energy
Clearinghouse (EREC)**,
(800) DOE-EREC (363- 3732), www.eren.doe.gov

Lighting

Increasing your lighting efficiency is one of the fastest ways to decrease your energy bills. If you replace 25% of your lights in high-use areas with fluorescents, you can save about 50% of your lighting energy bill.

Indoor Lighting

Use linear fluorescent and energy-efficient compact fluorescent lamps (CFLs) in fixtures throughout your home to provide high-quality and high-efficiency lighting. Fluorescent lamps are much more efficient than incandescent bulbs and last 6 to 10 times longer. Although fluorescent and compact fluorescent lamps are more expensive than incandescent bulbs, they pay for themselves by saving energy over their lifetime.

Indoor Lighting Tips

- Turn off the lights in any room you're not using, or consider installing timers, photo cells, or occupancy sensors to reduce the amount of time your lights are on.
- Use task lighting; instead of brightly lighting an entire room, focus the light where you need it. For example, use fluorescent under-cabinet lighting for kitchen sinks and countertops under cabinets.
- Consider three-way lamps; they make it easier to keep lighting levels low when brighter light is not necessary.
- Use 4-foot fluorescent fixtures with reflective backing and electronic

ballasts for your workroom, garage, and laundry areas.

- Consider using 4-watt mini-fluorescent or electro-luminescent night lights. Both lights are much more efficient than their incandescent counterparts. The luminescent lights are cool to the touch.
- Use CFLs in all the portable table and floor lamps in your home. Consider carefully the size and fit of these systems when you select them. Some home fixtures may not accommodate some of the larger CFLs.
- For spot lighting, consider CFLs with reflectors. The lamps range in wattage from 13-watt to 32-watt and provide a very directed light using a reflector and lens system.
- Take advantage of daylight by using light-colored, loose-weave curtains on your windows to allow daylight to



Compact Fluorescent Bulbs

These compact fluorescent bulbs are four times more energy efficient than incandescent bulbs and provide the same lighting.



penetrate the room while preserving privacy. Also, decorate with lighter colors that reflect daylight.

- If you have torchiere fixtures with halogen lamps, consider replacing them with compact fluorescent torchieres. Compact fluorescent torchieres use 60% to 80% less energy and can produce more light (lumens) than the halogen torchieres.

Look for the ENERGY STAR® label when purchasing these products.

Outdoor Lighting

Many homeowners use outdoor lighting for decoration and security. When shopping for outdoor lights, you will find a variety of products, from low-voltage pathway lighting to high-sodium motion-detector floodlights. Some stores also carry lights powered by small photovoltaic



Torchiere Lamp

Halogen lamps generate excessive heat that can create fire hazards. Use compact fluorescent lamps in your torchiere fixtures. They are safer and use much less energy.

(PV) modules that convert sunlight directly into electricity; consider PV-powered lights for areas that are not close to an existing power supply line.

Outdoor Lighting Tips

- Use outdoor lights with a photocell unit or a timer so they will turn off during the day.
- Turn off decorative outdoor gas lamps; just eight gas lamps burning year round use as much natural gas as it takes to heat an average-size home during an entire winter.
- Exterior lighting is one of the best places to use CFLs because of their long life. If you live in a cold climate, be sure to buy a lamp with a cold-weather ballast.

For more information on energy-efficient lighting, contact:

ENERGY STAR®, (888) STAR-YES (782-7937),
www.energystar.gov

**U.S. Department of Energy's
Energy Efficiency and Renewable Energy
Clearinghouse (EREC)**,
(800) DOE-EREC (363-3732), www.eren.doe.gov

Appliances

Appliances account for about 20% of your household's energy consumption, with refrigerators and clothes dryers at the top of the consumption list.

of the major appliances that carry the ENERGY STAR® label and provides helpful information on what to look for when shopping for an appliance.

To help you figure out whether an appliance is energy efficient, the federal government requires most appliances to display the bright yellow and black EnergyGuide label. Although these labels will not tell you which appliance is the most efficient, they will tell you the annual energy consumption and operating cost for each appliance so you can compare them yourself.



What's the Real Cost

Every appliance has two price tags—a purchase price and the operating cost.

When you're shopping for appliances, you can think of two price tags. The first one covers the purchase price—think of it as a down payment. The second price tag is the cost of operating the appliance during its lifetime. You'll be paying on that second price tag every month with your utility bill for the next 10 to 20 years, depending on the appliance. Refrigerators last an average of 20 years; room air conditioners and dishwashers, about 10 years each; clothes washers, about 14 years.

When you do have to shop for a new appliance, look for the ENERGY STAR® label. ENERGY STAR® appliances have been identified by the U.S. Environmental Protection Agency and DOE as being the most energy-efficient products in their classes. They usually exceed minimum federal standards by a substantial amount. The appliance shopping guide on pages 29 and 30 lists some

Dishwashers

Most of the energy used by a dishwasher is for water heating. The EnergyGuide label estimates how much power is needed per year to run the appliance and to heat the water based on the yearly cost of gas and electric water heating. When it is time to buy a new unit, look for the ENERGY STAR® label.

Dishwasher Tips

- Check the manual that came with your dishwasher for the manufacturer's recommendations on water temperature; many have internal heating elements that allow you to set the water heater to a lower temperature.
- Scrape, don't rinse, off large food pieces and bones. Soaking or prewashing is generally only recommended in cases of burned-on or dried-on food.
- Be sure your dishwasher is full, but not overloaded.
- Don't use 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.

- Let your dishes air dry; if you don't have an automatic air-dry switch, turn off the control knob after the final rinse and prop the door open a little so the dishes will dry faster.
- Remember that dishwashers use less water than washing dishes by hand, about 6 gallons less per load; dishwashers also use hotter water than you would use if you were washing the dishes by hand, so they can do a better job of killing germs.

What's a kilowatt?

When you cook a pot of rice for 1 hour, you use 1000 watts of electricity! One thousand watts equals 1 kilowatt-hour, or 1 kWh. Your utility bill usually shows what you are charged for the kilowatt-hours you use. The average residential rate is 8.3 cents per kWh. A typical U.S. household consumes about 10,000 kWh per year, costing an average of \$830 annually.

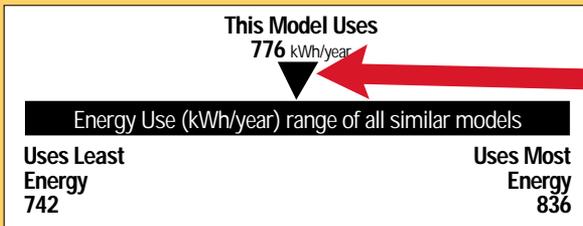
Based on standard U.S. Government tests

ENERGYGUIDE

Refrigerator-Freezer
With Automatic Defrost
With Side-Mounted Freezer
Without Through-the-Door-Ice Service

XYZ Corporation
Model ABC-W
Capacity: 23 Cubic Feet

Compare the Energy Use of this Refrigerator with Others before You Buy.



kWh/year (kilowatt-hours per year) is a measure of energy (electricity) use. Your utility company uses it to compute your bill. Only models with 22.5 to 24 cubic feet and the above features are used in this scale.

Refrigerators using more energy cost more to operate.
This model's estimated yearly operating cost is:

\$68

Based on a 1992 U.S. Government national average cost of 8.24¢ per kWh for electricity. Your actual operating cost will vary depending on your local utility rates and your use of the product.

Important: Removal of this label before consumer purchase is a violation of Federal law (42 U.S.C. 8302).

How to Read the EnergyGuide Label

The EnergyGuide label gives you two important pieces of information you can use for comparison of different brands and models when shopping for a new refrigerator:

- estimated energy consumption on a scale showing a range for similar models
- estimated yearly operating cost based on the national average cost of electricity.



Refrigerator Choices

Refrigerators with the freezer on top are more efficient than those with freezers on the side.

Refrigerators

The EnergyGuide label on new refrigerators will tell you how much electricity in kilowatt-hours (kWh) a particular model uses in one year. The smaller the number, the less energy the refrigerator uses and the less it will cost you to operate. In addition to the EnergyGuide label, don't forget to look for the ENERGY STAR® label. A new refrigerator with an ENERGY STAR® label will save you between \$35 and \$70 a year compared to the models designed 15 years

ago. This adds up to between \$525 and \$1,050 during the average 15-year life of the unit.

Refrigerator/Freezer Energy Tips

- Look for a refrigerator with automatic moisture control. Models with this feature have been engineered to prevent moisture accumulation on the cabinet exterior without the addition of a heater. This is not the same thing as an “anti-sweat” heater. Models with an anti-sweat heater will consume 5% to 10% more energy than models without this feature.
- Don't keep your refrigerator or freezer too cold. Recommended temperatures are 37° to 40°F for the fresh food compartment of the refrigerator and 5°F for the freezer section. If you have a separate freezer for long-term storage, it should be kept at 0°F.
- To check refrigerator temperature, place an appliance thermometer in a glass of water in the center of the refrigerator. Read it after 24 hours. To check the freezer temperature, place a thermometer between frozen packages. Read it after 24 hours.
- Regularly defrost manual-defrost refrigerators and freezers; frost buildup increases the amount of energy needed to keep the motor running. Don't allow frost to build up more than one-quarter of an inch.
- Make sure your refrigerator door seals are airtight. Test them by closing the door over a piece of paper or a dollar bill so it is half in and half out of the refrigerator. If you can pull the paper or bill out easily, the latch may need adjustment or the seal may need replacing.



How Much Electricity Do Appliances Use?

This chart shows how much energy a typical appliance uses per year and its corresponding cost based on national averages. For example, a refrigerator uses almost five times the electricity the average television uses.

- Cover liquids and wrap foods stored in the refrigerator. Uncovered foods release moisture and make the compressor work harder.
- Move your refrigerator out from the wall and vacuum its condenser coils once a year unless you have a no-clean condenser model. Your refrigerator will run for shorter periods with clean coils.

Other Energy-Saving Kitchen Tips

- Be sure to place the faucet lever on the kitchen sink in the cold position when using small amounts of water; placing the lever in the hot position uses energy to heat the water even though it never reaches the faucet.
- If you need to purchase a gas oven or range, look for one with an automatic,

electric ignition system. An electric ignition saves gas—typically 41% in the oven and 53% on the top burners—because a pilot light is not burning continuously.

- In gas appliances, look for blue flames; yellow flames indicate the gas is burning inefficiently and an adjustment may be needed.
- Keep range-top burners and reflectors clean; they will reflect the heat better, and you will save energy.
- Use a covered kettle or pan to boil water; it's faster and it uses less energy.
- Match the size of the pan to the heating element.
- If you cook with electricity, turn the stovetop burners off several minutes

before the allotted cooking time. The heating element will stay hot long enough to finish the cooking without using more electricity. The same principle applies to oven cooking.

- Use small electric pans or toaster ovens for small meals rather than your large stove or oven. A toaster oven uses a third to half as much energy as a full-sized oven.
- Use pressure cookers and microwave ovens whenever it is convenient to do so. They can save energy by significantly reducing cooking time.

Laundry

About 80% to 85% of the energy used for washing clothes 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. Unless you're dealing with oily stains, the warm or cold water setting on your machine will generally do a good job of cleaning your clothes. Switching your temperature setting from hot to warm can cut a load's energy use in half.

When shopping for a new washer, look for a front loading (horizontal-axis) machine. This machine may cost more to buy but uses about a third of the energy and less water than a top-loading machine. With a front loader, you'll also save more on clothes drying, because they remove more water from your clothes during the spin cycle. Look for the ENERGY STAR® label.

When shopping for a new clothes dryer, look for one with a moisture sensor that automatically shuts off the machine when your clothes are dry. Not only will this save energy, it will save wear and tear on your clothes caused by over-drying.

Keep in mind that gas dryers are less expensive to operate than electric dryers. The cost of drying a typical load of laundry in an electric dryer is 30 to 40 cents compared to 15 to 25 cents in a gas dryer.

Laundry Tips

- Wash your clothes in cold water using cold-water detergents whenever possible.
- Wash and dry full loads. If you are washing a small load, use the appropriate water-level setting.
- Dry towels and heavier cottons in a separate load from lighter-weight clothes.
- Don't over-dry your clothes. If your machine has a moisture sensor, use it.
- Clean the lint filter in the dryer after every load to improve air circulation.
- Use the cool-down cycle to allow the clothes to finish drying with the residual heat in the dryer.

For more information on energy-efficient appliances, contact:

ENERGY STAR®, (888) STAR-YES (782-7937), www.energystar.gov

U.S. Department of Energy's Energy Efficiency and Renewable Energy Clearinghouse (EREC), (800) DOE-EREC (363-3732), www.eren.doe.gov



Major Appliance Shopping Guide

This easy-to-read guide may help you understand how appliances are rated for efficiency, what the ratings mean, and what to look for while shopping for new appliances.

Appliances	Rating	Special Considerations																		
Natural Gas and Oil Systems 	AFUE is the Annual Fuel Utilization Efficiency rating. The AFUE measures the seasonal or annual efficiency. For ENERGY STAR® products, 90 is the AFUE rating.	Size is one of the most important factors affecting the efficiency of the AFUE. Too large a system costs more and operates inefficiently. Bigger is not always better! Have a professional assess your needs and recommend the type and size of system you should purchase.																		
Room Air Conditioners 	EER is the Energy Efficiency Rating. The higher the EER, the more efficient the unit is. ENERGY STAR® units are among the most energy-efficient products and exceed minimum federal standards by at least 15%.	What size to buy? <table border="1"> <thead> <tr> <th>Area in square feet</th> <th>Btu/hour</th> </tr> </thead> <tbody> <tr> <td>100 to 150</td> <td>5,000</td> </tr> <tr> <td>150 to 250</td> <td>6,000</td> </tr> <tr> <td>250 to 350</td> <td>7,000</td> </tr> <tr> <td>350 to 400</td> <td>9,000</td> </tr> <tr> <td>400 to 450</td> <td>10,000</td> </tr> <tr> <td>450 to 550</td> <td>12,000</td> </tr> <tr> <td>550 to 700</td> <td>14,000</td> </tr> <tr> <td>700 to 1,000</td> <td>18,000</td> </tr> </tbody> </table> <p>Two major decisions should guide your purchase. Buy a correctly sized unit! Buy an energy-efficient unit! If the room is very sunny, increase capacity by 10%. If the unit is for a kitchen, increase the capacity by 4,000 Btu per hour.</p>	Area in square feet	Btu/hour	100 to 150	5,000	150 to 250	6,000	250 to 350	7,000	350 to 400	9,000	400 to 450	10,000	450 to 550	12,000	550 to 700	14,000	700 to 1,000	18,000
Area in square feet	Btu/hour																			
100 to 150	5,000																			
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350 to 400	9,000																			
400 to 450	10,000																			
450 to 550	12,000																			
550 to 700	14,000																			
700 to 1,000	18,000																			
Central Air Conditioners 	SEER is the Seasonal Energy Efficiency Rating. SEER rates the efficiency during the cooling season. Look for a SEER rating of 12 or above.	Air conditioners that bear the ENERGY STAR® label are at least 20% more efficient than new air conditioners that meet the federal minimum standards for efficiency and may be twice as efficient as some existing systems. Contact a professional for advice on sizing a central air system.																		
Central Air-to-Air Heat Pumps 	SEER indicates cooling efficiency. HSPF is the Heating Seasonal Performance Factor and indicates heating efficiency.	If you live in a cool climate, look for a heat pump with a high HSPF. If you purchase an ENERGY STAR® heat pump, you are getting a product that is in the top 25% for efficiency. Contact a professional for advice on purchasing air-to-air heat pumps.																		

The ENERGY STAR label is the government's seal of approval. It was created by the U.S. Department of Energy and the U.S. Environmental Protection Agency. These agencies set the criteria to help shoppers for large and small home appliances identify the most energy-efficient products on the market. ENERGY STAR-labeled appliances exceed existing federal efficiency standards, typically, by 13% to 20%, and as much as 110% for some appliances. Customers can be assured that the appliance being purchased is a high-performance product which will reduce the operating cost of that appliance or product every month during the course of its lifetime.

Appliances	Rating	Special Considerations
Refrigerators and Freezers 	Look for the FTC (Federal Trade Commission) label on the appliance to tell you how much electricity, in kilowatt-hours (kWh) a particular model will use in one year. The smaller the number, the less energy it uses.	Look for an “energy saver” switch on models with the freezer on top. When buying a frost-free refrigerator, find one with an energy-efficient option. Refrigerators with freezers on top are more efficient than those with freezers on the side. Look for heavy door hinges, which create a good door seal. ENERGY STAR®-labeled units exceed federal standards by at least 20%.
Dishwashers 	EF is the Energy Factor. This number represents the number of complete cycles that a dishwasher will operate while using one kilowatt-hour of electricity. ENERGY STAR® dishwashers have an EF of 0.52 or greater, 13% better than current federal standards.	Look for features that will reduce water use, such as booster heaters and smart controls. Ask how many gallons of water the dishwasher uses during different cycles. Dishwashers that use the least amount of water will cost the least to operate.
Programmable Thermostats 		Look for: a thermostat that allows you to easily use two separate programs; an “advanced recovery” feature that can be programmed to reach the desired temperature at a specific time; a hold feature that temporarily overrides the setting without deleting preset programs. Look for the ENERGY STAR® label.
Clothes Washers 	EF stands for Energy Factor. The EF is the number of complete cycles that a clothes washer will operate while using one kilowatt-hour of electricity. ENERGY STAR® units must have an EF of 2.5 or more above the current federal standard of 1.18	Look for the following design features that help clothes washers cut water usage: front-loading design, water level controls, “suds-saver” features, spin cycle adjustment, and large capacity. For double the efficiency, buy an ENERGY STAR® unit.
Hot Water Heaters	EF is the Energy Factor rating the overall efficiency of the heater. The FHR is the First Hour Rating of the system, which measures the maximum hot water the heater will deliver in the first hour of use from a cold start.	Buy a water heater with a thick insulating shell. If you want hot water fast, the FHR rating will be important to you. Sizing is important—call your local utility for advice.

Source List

Air Conditioning and Refrigeration Institute

4301 North Fairfax Drive, Suite 425
Arlington, VA 22203
E-mail: ari@dgsys.com
Phone: (703) 524-8800
Fax: (703) 528-3816
www.ari.org

American Architectural Manufacturers Association (AAMA)

1827 Walden Office Square, Suite 104
Schaumburg, IL 60173-4628
E-mail: webmaster@AAMANET.org
Phone: (847) 303-5664
Fax: (847) 303-5774
www.aamanet.org

American Council for an Energy-Efficient Economy (ACEEE)

1001 Connecticut Avenue Suite 801
Washington, DC 20036
Phone (Research and Conferences):
(202) 429-8873
Publications: (202) 429-0063
www.aceee.org

American Forests

P.O. Box 2000
Washington, DC 20013
(202) 955-4500
www.amfor.org:80/dirt.html

American Society of Landscape Architects (ASLA)

636 Eye Street, NW
Washington, DC 20001-3736
Phone: (202) 898-2444
Fax: (202) 898-1185
www.asla.org

American Solar Energy Society (ASES)

2400 Central Avenue, Unit G-1
Boulder, CO 80301
Phone:(303) 443-3130
Fax: (303) 443-3212
www.sni.net/solar

Association of Home Appliance Manufacturers

20 N. Wacker Drive, Suite 1231
Chicago, IL 60606
Phone: (312) 984-5800
Fax: (312) 984-5823
www.aham.org

Cellulose Insulation Manufacturers Association (CIMA)

136 South Keowee Street
Dayton, OH 45402
E-mail: CIMA@dayton.net
Phone: (937) 222-2462
Fax: (937) 222-5794
www.cellulose.org

Energy Star

U.S. EPA Atmospheric Pollution
Prevention Division
401 M Street, SW, (6202J)
Washington, DC 20460
Phone: (202) 233-9190
Toll Free: (888) STAR-YES (782-7937)
Fax: (202) 233-9569
Fax-back system: (202) 233-9659
www.energystar.gov

E Source, Inc.

1033 Walnut Street
Boulder, CO 80302-5114
Phone: (303) 440-8500
Fax: (303) 440-8502
www.esource.com

Florida Solar Energy Center (FSEC)

1679 Clearlake Road
Cocoa, FL 32922-5703
E-mail: webmaster@fsec.ucf.edu
Phone: (407) 638-1015
Fax: (407)638-1010
www.fsec.ucf.edu

Insulation Contractors Association of America (ICAA)

1321 Duke Street, Suite 303
Alexandria, VA 22314
E-mail: icaa@erols.com
Phone: (703) 739-0356
Fax: (703) 739-0412
www.insulate.org

Source List

National Arbor Day Foundation (NADF)
100 Arbor Avenue
Nebraska City, NE 68410
Phone: (402) 474-5655
www.arborday.org

National Association of Home Builders
(NAHB)
1201 15th Street, NW
Washington, DC 20005
E-mail: info@nahb.com
Phone: (800) 368-5242
www.nahb.com

National Fenestration Rating Council
(NFRC)
1300 Spring Street, Suite 120
Silver Spring, MD 20910
E-mail: NFRCUSA@aol.com
Phone: (301) 589-NFRC (589-6372)
Fax: (301) 588-0854
www.nfrc.org

National Wood Window and Door
Association
1400 East Touhy Avenue, Suite 470
Des Plaines, IL 60018
Phone: (800) 223-2301
Fax: (847) 299-1286
www.nwwda.org

North American Insulation
Manufacturers Association (NAIMA)
44 Canal Center Plaza, Suite 310
Alexandria, VA 22314
E-mail: insulation@naima.org
Phone: (703) 684-0084
Fax: (703) 684-0427
www.naima.org

Owens Corning
One Owens Corning Parkway
Toledo, OH 43659
Phone: (419) 248-8000
Customer Service Hotline:
(800) GET PINK (438-7465)
www.owenscorning.com

Polyisocyanurate Insulation
Manufacturers Association (PIMA)
1001 Pennsylvania Avenue, NW
Suite 500 North
Washington, DC 20004
Phone: (202) 624-2709
Fax: (202) 628-3856
www.pima.org

Rocky Mountain Institute
1739 Snowmass Creek Road
Snowmass, CO 81654-9199
E-mail: kmink@rmi.org
Phone: (970) 927-3851
Fax: (970) 927-3420
www.rmi.org

Solar Energy Industries Association
(SEIA)
122 C Street, NW, 4th Floor
Washington, DC 20001
Phone: (202) 383-2600
Fax: (202) 383-2670
www.seia.org

Solar Rating and Certification
Corporation (SRCC)
C/O FSEC, 1679 Clearlake Road
Cocoa, FL 32922-5703
E-mail: SRCC@FSEC.ucf.edu
Phone: (407) 638-1537
Fax: (407) 638-1010

U.S. Department of Energy's
Energy Efficiency and Renewable
Energy Clearinghouse (EREC)
P.O. Box 3048
Merrifield, VA 22116
E-mail: doe.erec@nciinc.com
Fax: (703) 893-0400
TDD: (800) 273-2957
BBS: (800) 273-2955
(800) DOE-EREC (363-3732)
www.eren.doe.gov/erec/factsheets

References

Association of Home Appliance Manufacturers, 20 N. Wacker Drive, Suite 1231, Chicago, IL 60606. (312) 984-5800.

Heede, Richard, et al. *Homemade Money*. The Rocky Mountain Institute, 1739 Snowmass Creek Road, Snowmass, CO 81654-9199. (970) 927-3851.

U.S. Department of Energy's Energy Efficiency and Renewable Energy Clearinghouse Fact Sheets, www.eren.doe.gov/erec/factsheets, P.O. Box 3048, Merrifield, VA 22116. (800) DOE-EREC (363-3732).

U.S. Department of Energy Office of Building Technologies, State and Community Programs, *Core Databook*, May, 1997.

Wilson, Alex, and Morrill, John. *Consumer Guide to Home Energy Savings*. American Council for an Energy-Efficient Economy (ACEEE), 1001 Connecticut Avenue, Suite 801, Washington, D.C. 20036.

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(800) DOE-EREC (363-3732)
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National Technical Information Service (NTIS)

U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4650

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(423) 576-8401



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