

Prepare Your Home Against Winter & High Energy Costs

One of the best ways to prepare a home for the winter weather and high energy costs is to take time now, before winter arrives, to do some simple home maintenance.

The first and most important step in weatherizing a home is to stop air leaks. If air leaks aren't stopped first, other weatherizing measures like insulation will be a waste of effort and money. Stopping air leaks in a home can save as much as 40 percent on your home's heating and cooling costs.

Below are a variety of home tightening tasks that will save money, energy and make a home feel more comfortable. Don't feel that everything on the list has to be done. Each task will help contribute to the overall savings and comfort of the home.

The Main Floor

- Electric Outlets – Install foam gaskets behind all the light switches and electrical outlet covers, even interior walls. These simple foam gaskets help seal the holes created when the outlets and light switches are built into homes. Then use child safety plugs to keep the cold air from coming in through the sockets.
- Air Conditioners – Remove window air conditioners. If they can't be removed, seal up the area around the unit with removable rope caulk and add an AC window insulation blanket.
- Windows and Doors – Weather strip and caulk all cracks between the wall and the window trim, especially under the windowsills. Replace broken glass and putty any loose windowpanes. Caulk around the moving parts of windows with a non-permanent caulk during the winter. This type of caulk can be easily removed in the spring.
- Recessed Lights and Bathroom Fans – Caulk around these from below with high-temperature flexible caulk.
- Other Exterior Wall Holes – Seal around all ceiling fixtures, heat registers, medicine cabinets, bath tubs, kitchen cabinets, drains and water pipes where they enter the wall and any other holes in exterior walls.
- Fireplace Dampers – Missing or poorly fitting dampers allow air to move freely up and down the chimney. Install a new damper or repair the existing one so it closes tightly.

Monsters in the Attic and Basement --- The attic and basement are the biggest air leak culprits in homes. Sealing up the air leaks in these two areas is the best guarantee for a comfortable home.

- Doors and hatches to the attic – Weather strip the edges and insulate the backside of the attic door. Fold-down stairs can be covered with a lightweight box made of rigid insulation board.
- Holes in the attic floor – Don't be surprised to find your attic has holes in the floor – especially around the outside walls, ducts, recessed lights or near plumbing utilities and other outside penetration. Also, look for dirty spots in your insulation, which often indicates 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. Carefully check for these trouble spots.

- Chimney – Any gap that runs vertically the height of the house around the chimney should be sealed at both the basement ceiling and attic floor levels. Seal these with sheet metal. This job may be best hired out.
- Basement – Use the masonry caulk to fill any cracks where the frames of the windows are set into the walls. Windows that are not used for summer ventilation, or as fire exits can be permanently caulked shut. Check along the sill plate and band joists as well as where the ducts pass through the basement ceiling.

The Tools --- The basic tools needed to tighten up a home are a good all-purpose caulk, a caulking gun. Tiller caulk can be used for larger holes, while some may need to be filled with expanding foam. Weather stripping can be used for doors and windows and insulating gaskets may be used for electrical outlets.

Stop Drafts --- Next, weatherize the rooms that are used the most, such as the living room, family room and bedrooms. Caulk around windows, doors, baseboards, lighting fixtures and any other cracks in the walls or ceiling. These holes may seem small, but their net impact is huge. It is estimated that the accumulative effect of all the cracks and holes in the average U.S. home is equal to having a large window open. Caulking also stops drafts and, therefore, makes the room feel more comfortable. This reduces the urge to reach for the thermostat and turn it up, which reduces energy consumption and cost.

Chances are when winter comes along, you'll spend a lot more evenings indoors cozying by the fire with a hot cup of tea. Our last blog was about making sure everything outside the house, from the roof to the gutters, was in tip-top shape to weather the coming storms. That preparation goes a long way in helping you feel secure when wind and sleet come banging against your walls like uninvited guests. With the majority of the autumn still ahead, there's still plenty of opportunity to gear up the rest of the house. It's the part most lived in: the indoors.

Perhaps the most appealing part of being home when it's cold out is the comfort of staying warm. But even this is no guarantee when your heating system can go out on you at any moment. Fortunately there are easy maintenance measures you can take to prevent that from happening. Here are some of them:

- Have the furnace system and heating vents cleaned out.
- Replace the air filters. This should be done every year around this time.
- If you have a system that uses natural gas, check to [make sure the pilot light is working](#). It should be blue.
- [Check your thermostat](#) to make sure it's working. One way to do this is to compare its reading with a thermometer.
- Insulate your hot water heater with an insulating blanket.
- Water pipes will also be working harder to keep the hot water coming. Similar to what you've done with the heater, insulate water pipes with wraps or heat tape.
- If you have insulation under floors and in walls, you generally don't need to add more. [Check unfinished attic areas](#), though, for an R value of at least 19-22.

After you've checked your heating systems, investigate doors and windows for gaps and cracks. These areas might need some new caulking or [weather stripping](#). Also keep in mind that light curtains retain less heat than a heavier drape does. Other areas that may need fresh sealing are around electrical outlets and around loose faucets.

Now that you know you'll be warm in the house, you can nearly guarantee having a comfortable winter indoors. There are only a few steps left, and these involve safety. Before you breath heated, unventilated air all day, you will want a chimney inspector to check your chimney, not just for cracks, but for creosote. When creosote accumulates, it can be hazardous enough to start a fire. Speaking of potential fires, make sure your carbon monoxide detector is installed and your smoke detector has batteries. Afterwards, get your fuzzy slippers ready and keep your marshmallows stocked for that cocoa. You've earned some winter downtime.

http://www1.eere.energy.gov/consumer/tips/monthly_tips.html



U.S. Department of Energy
Energy Efficiency and Renewable Energy

Monthly Tips

Don't Let High Fuel Costs Drive You Nuts

Whether you drive an economy car or an SUV, there are plenty of ways to improve your gas mileage. Avoid aggressive driving and observe the speed limit. Speeding, fast acceleration, and hard braking wastes gas. Lighten your load by clearing your car of extra weight, and remove roof racks or carriers if not used frequently. Keep current with car maintenance—clean air filters can improve gas mileage by as much as 10%. Properly inflated and aligned tires will improve gas mileage by 3%. Using the wrong grade of oil can reduce mileage by 1% to 2%. For longer-term savings, consider a high-mileage vehicle for your next purchase. See

<http://www.fueleconomy.gov/> for more on buying a fuel-efficient car or truck. Check out [Driving and Car Maintenance](#) for more tips at:

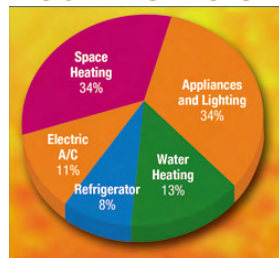
(<http://www1.eere.energy.gov/consumer/tips/driving.html>).

Track Your Energy Costs with a Home Energy Audit

An energy audit will show you which areas of your home use the most energy and help you decide the most effective way to reduce energy costs. You can conduct a simple audit yourself, contact your local utility, or call an independent energy auditor for a more comprehensive examination. Check your home's insulation levels, and check for open fireplace dampers. Look for holes or cracks around doors, light and plumbing fixtures, and other places where air may leak into or out of your home. Make sure your appliances and heating and cooling systems are properly maintained, and study your family's lighting needs and use patterns, paying special attention to high-use areas. Check out [Your Home's Energy Use](#) for more tips

(http://www1.eere.energy.gov/consumer/tips/home_energy.html).

Your Home's Energy Use



How We Use Energy in Our Homes

Heating accounts for the biggest chunk of a typical utility bill.

Source: 2005 Building Energy Data Book, Table 4.2.1

(<http://buildingsdatabook.eere.energy.gov/docs/4.2.1.pdf>).

The first step to taking a wholehouse energy efficiency approach is to find out which parts of your house use the most energy. A home energy audit will pinpoint those areas and suggest the most effective measures for cutting 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. For more information about home energy audits, including free tools and calculators, visit the [Consumer's Guide](#) or the Residential Energy Services Network (RESNET).

Energy Auditing Tips

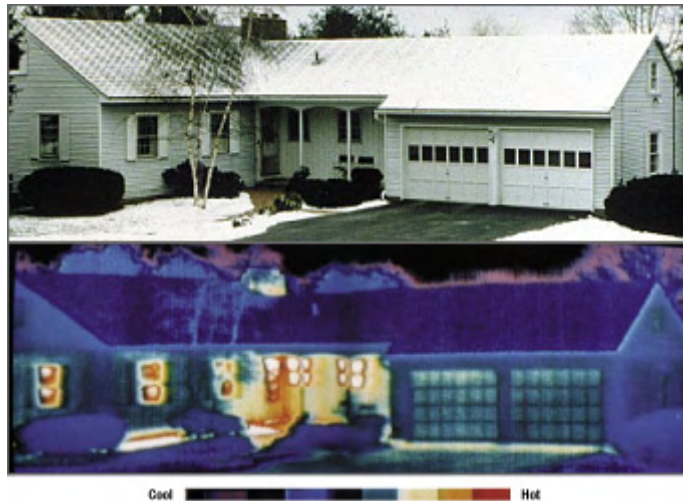
- Check the insulation levels in your attic, exterior and basement walls, ceilings, floors, and crawl spaces. Visit the [Consumer's Guide](#) for instructions on checking your insulation levels.
(http://www.eere.energy.gov/consumer/your_home/insulation_airsealing/index.cfm/mytopic=11350).
- Check for 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. Check your owner's manuals for the recommended maintenance.
- Study your family's lighting needs and use patterns, paying special attention to high-use areas such as the living room, kitchen, and outside lighting. Look for ways to use lighting controls—like occupancy sensors, dimmers, or timers—to reduce lighting energy use, and replace standard (also called incandescent) light bulbs and fixtures with compact or standard fluorescent lamps.

Formulating Your Plan

After you have identified where your home is losing energy, assign priorities 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 cost savings?
- Do the energy saving measures provide additional benefits that are important to you (for example, increased comfort from installing double-paned, efficient windows)?
- How long do you plan to own your current home?
- 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 small charge. For a fee, a professional contractor will analyze how well your home's energy systems work together and compare the analysis to your utility bills. He or she will use a variety of equipment such as blower doors, infrared cameras, and surface thermometers to find leaks and drafts. After gathering information about your home, the contractor or auditor will give you a list of recommendations for cost-effective energy improvements and enhanced comfort and safety. A good contractor will also calculate the return on your investment in high-efficiency equipment compared with standard equipment.



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 heat escaping. The red represents the area of the greatest heat loss.

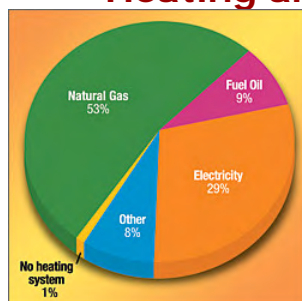
Tips for Finding a Contractor

- Ask neighbors and friends for recommendations
- Look in 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
- Check with the Better Business Bureau

This Winter, Save Money and Stay Warm

Keep your energy bill and your pollution output low this winter by taking a whole-house approach to heating. Start with setting your thermostat as low as is comfortable. A programmable thermostat can help by adjusting the temperature according to your schedule—it can cut back heating at night, for instance, and turn it up again before you rise in the morning. It's also important to weatherize your home—caulk and weatherstrip any doors and windows that leak air. Make sure your equipment is properly maintained and cleaned, and that furnace filters are replaced regularly. Finally, insulation is inadequate in many homes. 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. Check out [Heating and Cooling](http://www1.eere.energy.gov/consumer/tips/heating_cooling.html) for more tips at (http://www1.eere.energy.gov/consumer/tips/heating_cooling.html).

Heating and Cooling



Household Heating Systems--- Although several different types of fuels are available to heat our homes, more than half of us use natural gas.

Heating and cooling your home uses more energy and drains more energy dollars than any other system in your home. Typically, 45% of your utility bill goes for heating and cooling.

What's more, heating and cooling systems in the United States together emit 150 million tons of carbon dioxide into the atmosphere each year, adding to global climate change. They also generate about 12% of the nation's sulfur dioxide and 4% 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 your 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, air sealing, and thermostat settings, you can cut your energy use for heating and cooling, and reduce environmental emissions, from 20% to 50%.

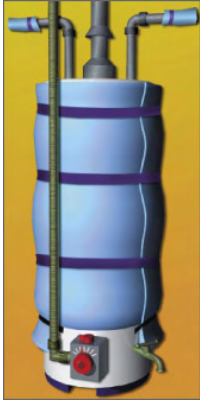
Heating and Cooling Tips

- Set your thermostat as low as is comfortable in the winter and as high as is comfortable in the summer.
- 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.
- Turn off kitchen, bath, and other exhaust fans within 20 minutes after you are done cooking or bathing; when replacing exhaust fans, consider installing high-efficiency, low-noise models.
- During the heating season, keep the draperies and shades on your southfacing windows open during the day to allow the sunlight to enter your home and closed at night to reduce the chill you may feel from cold windows.
- During the cooling season, keep the window coverings closed during the day to prevent solar gain.
- **\$ Long-Term Savings Tip:** Select energy-efficient products when you buy new heating and cooling equipment. Your contractor should be able to give you energy fact sheets for different types, models, and designs to help you compare energy usage. For furnaces, look for high Annual Fuel Utilization Efficiency (AFUE) ratings. The national minimum is 78% AFUE, but there are [ENERGY STAR](http://www.energystar.gov/) (<http://www.energystar.gov/>) models on the market that exceed 90% AFUE.
- **\$ Long-Term Savings Tip:** For air conditioners, look for a high Seasonal Energy Efficiency Ratio (SEER). The current minimum is 13 SEER for central air conditioners. [ENERGY STAR](#) models are 13 SEER or more. The American Council for an Energy-Efficient Economy provides tips for buying energy-efficient furnaces, boilers, AC units, and heat pumps on its [Web site](http://www.aceee.org/) (<http://www.aceee.org/>).

Keep Your Energy Bill Out of Hot Water

Water heating can be expensive, but there are a number of ways to lower your costs. One way is to use less water. Repair leaky faucets immediately and use low-flow shower heads. (A family of four, each showering for five minutes a day, uses 700 gallons of water a week; you can cut that amount in half by using low-flow aerating showerheads.) Insulate your hot-water storage tank and pipes, and drain a quart of water from your water tank every three months to remove sediment that impedes heat transfer and lowers the efficiency of your heater (follow the manufacturer's instructions). Lower the thermostat on your water heater to 120 degrees; water heaters sometimes come from the factory with higher temperature settings than are necessary. When buying a new water heater, compare *EnergyGuide labels* to find an energy-efficient model. Check out [Water Heating](http://www1.eere.energy.gov/consumer/tips/water_heating.html) for more tips at: (http://www1.eere.energy.gov/consumer/tips/water_heating.html).

Water Heating



Keep Your Energy Bills Out of Hot Water-- Insulate your water heater to save energy and money. Water heating is the third largest energy expense in your home. It typically accounts for about 13% 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, or buy a new, more efficient water heater.

Water Heating Tips

- Install aerating, low-flow faucets and showerheads.
- Repair leaky faucets promptly; a leaky faucet wastes gallons of water in a short period of time.
- Lower the thermostat on your water heater; water heaters sometimes come from the factory with high temperature settings, but a setting of 120°F provides comfortable hot water for most uses.
- Take more showers than baths. Bathing uses the most hot water in the average household.
- Insulate your electric hot-water storage tank, but be careful not to cover the thermostat. Follow the manufacturer's recommendations.
- Insulate your natural gas or oil hot-water storage tank, but be careful not to cover the water heater's top, bottom, thermostat, or burner compartment. Follow the manufacturer's recommendations; when in doubt, get professional help.
- Insulate the first 6 feet of the hot and cold water pipes connected to the water heater.
- If you are in the market for a new dishwasher or clothes washer, consider buying an efficient, water-saving [ENERGY STAR](#) model to reduce hot water use. See [Appliances](#) for more information view: (<http://www1.eere.energy.gov/consumer/tips/appliances.html>).



Appliances



What's the Real Cost?--- Every appliance has two price tags—the purchase price and the operating cost. Consider both when buying a new appliance.

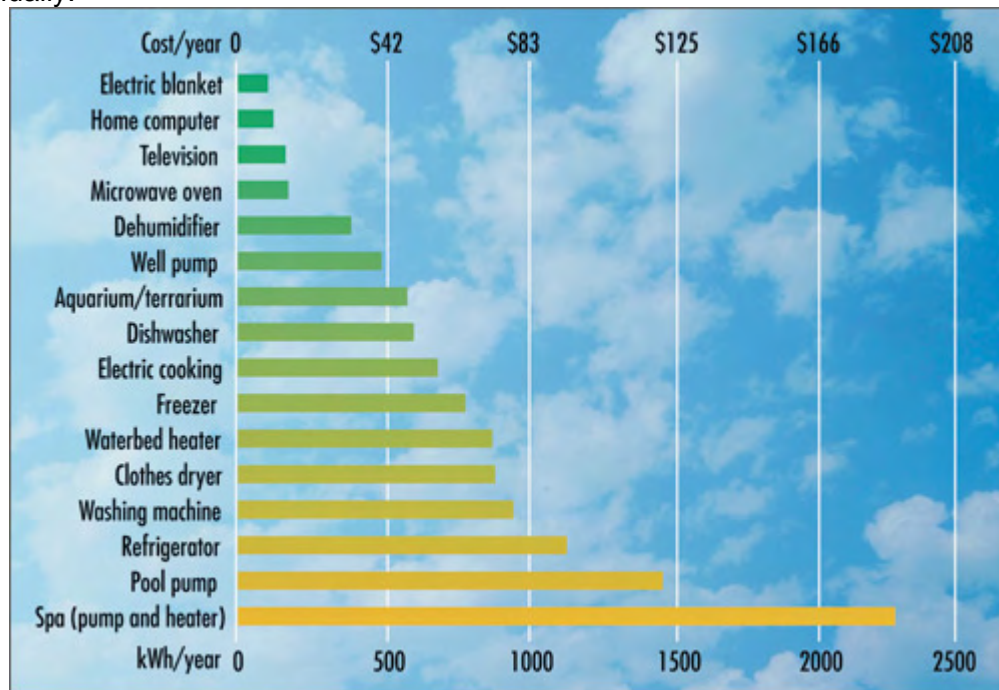
Appliances account for about 20% of your household's energy consumption with refrigerators, clothes washers, and clothes dryers at the top of the consumption list.

When you're shopping for appliances, 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 13 years; room air conditioners and dishwashers, about 11 years each; clothes washers, about 9 years.

When you do have to shop for a new appliance, look for the [ENERGY STAR](#) label. [ENERGY STAR](#) products usually exceed minimum federal standards by a substantial amount. The [appliance shopping guide](#) lists some 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](#) (<http://www1.eere.energy.gov/consumer/tips/energyguide.html>). 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. The American Council for an Energy-Efficient Economy lists the energy performance of top-rated energy-saving appliances on its [Web site](#) (<http://www.aceee.org/>).

What's a kilowatt?

When you use electricity to cook a pot of rice for 1 hour, you use 1000 watt-hours of electricity! One thousand watt-hours 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 11,000 kWh per year, costing an average of \$900 annually.



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. Visit the [Consumer's Guide](#) for instructions on calculating the electrical use of your appliances.

- Install heat traps on the hot and cold pipes at the water heater to prevent heat loss. Some new water heaters have built-in heat traps.
- Drain a quart of water from your water tank every 3 months to remove 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.
- 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.
- **\$ Long-Term Savings Tip:** Buy a new energy-efficient water heater. While it may cost more initially than a standard water heater, the energy savings will continue during the lifetime of the appliance. Look for the [EnergyGuide label](#).
(<http://www1.eere.energy.gov/consumer/tips/energyguide.html>)

Visit the [Consumer's Guide](#) for instructions on calculating the electrical use of your appliances visit: (http://www.eere.energy.gov/consumer/your_home/appliances/index.cfm/mytopic=10040).

Estimating Appliance and Home Electronic Energy Use

If you're trying to decide whether to invest in a more energy-efficient appliance or you'd like to determine your electricity loads, you may want to estimate appliance energy consumption.

Formula for Estimating Energy Consumption

You can use this formula to estimate an appliance's energy use:

(Wattage × Hours Used Per Day ÷ 1000 = Daily Kilowatt-hour (kWh) consumption

(1 kilowatt (kW) = 1,000 Watts)

Multiply this by the number of days you use the appliance during the year for the annual consumption. You can then calculate the annual cost to run an appliance by multiplying the kWh per year by your local utility's rate per kWh consumed.

Note: To estimate the number of hours that a refrigerator actually operates at its maximum wattage, divide the total time the refrigerator is plugged in by three. Refrigerators, although turned "on" all the time, actually cycle on and off as needed to maintain interior temperatures.

Examples:

Window fan:

$(200 \text{ Watts} \times 4 \text{ hours/day} \times 120 \text{ days/year}) \div 1000$
 $= 96 \text{ kWh} \times 8.5 \text{ cents/kWh}$
 $= \$8.16/\text{year}$

Personal Computer and Monitor:

$(120 + 150 \text{ Watts} \times 4 \text{ hours/day} \times 365 \text{ days/year}) \div 1000$
 $= 394 \text{ kWh} \times 8.5 \text{ cents/kWh}$
 $= \$33.51/\text{year}$

Wattage

You can usually find the wattage of most appliances stamped on the bottom or back of the appliance, or on its nameplate. The wattage listed is the maximum power drawn by the appliance. Since many appliances have a range of settings (for example, the volume on a radio), the actual amount of power consumed depends on the setting used at any one time. If the wattage is not listed on the appliance, you can still estimate it by finding the current draw (in amperes) and multiplying that by the voltage used by the appliance. Most appliances in the United States use 120 volts. Larger appliances, such as clothes dryers and electric cooktops, use 240 volts. The amperes might be stamped on the unit in place of the wattage. If not, find a clamp-on ammeter—an electrician's tool that clamps around one of the two wires on the appliance—to measure the current flowing through it. You can obtain this type of ammeter in

stores that sell electrical and electronic equipment. Take a reading while the device is running; this is the actual amount of current being used at that instant.

When measuring the current drawn by a *motor*, note that the meter will show about three times more current in the first second that the motor starts than when it is running smoothly.

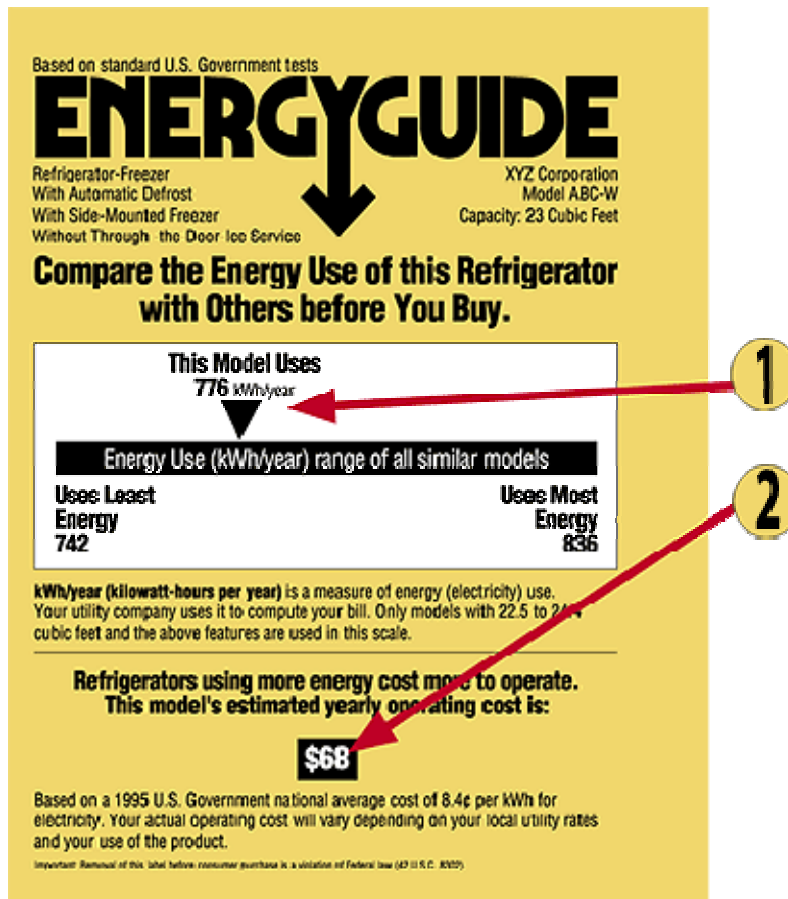
Many appliances continue to draw a small amount of power when they are switched "off." These "phantom loads" occur in most appliances that use electricity, such as VCRs, televisions, stereos, computers, and kitchen appliances. Most phantom loads will increase the appliance's energy consumption a few watt-hours. These loads can be avoided by unplugging the appliance or using a power strip and using the switch on the power strip to cut all power to the appliance.

Typical Wattages of Various Appliances

Here are some examples of the range of nameplate wattages for various household appliances:

- Aquarium = 50–1210 Watts
- Clock radio = 10
- Coffee maker = 900–1200
- Clothes washer = 350–500
- Clothes dryer = 1800–5000
- Dishwasher = 1200–2400 (using the drying feature greatly increases energy consumption)
- Dehumidifier = 785
- Electric blanket- *Single/Double* = 60 / 100
- Fans
 - Ceiling = 65–175
 - Window = 55–250
 - Furnace = 750
 - Whole house = 240–750
- Hair dryer = 1200–1875
- Heater (*portable*) = 750–1500
- Clothes iron = 1000–1800
- Microwave oven = 750–1100
- Personal computer
 - CPU - awake / asleep = 120 / 30 or less
 - Monitor - awake / asleep = 150 / 30 or less
 - Laptop = 50
- Radio (*stereo*) = 70–400
- Refrigerator (*frost-free, 16 cubic feet*) = 725
- Televisions (color)
 - 19" = 65–110
 - 27" = 113
 - 36" = 133
 - 53"-61" Projection = 170
 - Flat screen = 120
- Toaster = 800–1400
- Toaster oven = 1225
- VCR/DVD = 17–21 / 20–25
- Vacuum cleaner = 1000–1440
- Water heater (*40 gallon*) = 4500–5500
- Water pump (*deep well*) = 250–1100
- Water bed (*with heater, no cover*) = 120–380

How to Read the EnergyGuide Label--- The EnergyGuide label gives you two important pieces of information you can use to compare different brands and models when shopping for a new appliance:



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

- **\$ Long-Term Savings Tip:** Consider installing a drain water waste heat recovery system. A recent DOE study showed energy savings of 25% to about 30% for water heating using such a system.
- **\$ Long-Term Savings Tip:** Consider natural-gas on-demand or tankless water heaters. Researchers have found savings can be up to 30% compared with a standard natural-gas storage tank water heater.
- **\$ Long-Term Savings Tip:** Heat pump water heaters are very economical in some areas.

Average Hot Water Use

Activity	Gallons per Use
Clothes washing	32
Showering	20
Bathing	20
Automatic dishwashing	12
Preparing food	5
Hand dishwashing	4

Solar Water Heaters

If you heat water with electricity, have high electric rates, and have an unshaded, south-facing location (such as a roof) on your property, 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. More than 1.5 million homes and businesses in the United States have invested in solar water heating systems, and surveys indicate 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, look for systems certified by the Solar Rating and Certification Corporation or the Florida Solar Energy Center.

- **\$ Long-Term Savings Tip:** Visit the [Database of State Incentives for Renewable Energy](http://www.dsireusa.org/) Web site (<http://www.dsireusa.org/>) to see if you might qualify for tax credits or rebates for buying a solar water heater.

Cut Loads of Energy While Doing the Laundry

It's easy to cut your energy costs for laundry. About 80%-85% of the energy used for washing clothes is used to heat the water. You can reduce this cost by using less water by washing full loads and using cooler water and cold-water detergents - switching the temperature setting from hot to warm cuts a load's energy use in half. . If you are in the market for a new washer, look for the ENERGY STAR and read EnergyGuide labels. You can reduce drying costs as well: clean the lint filter after every load to improve air circulation, and don't over-dry clothes. Use the cool-down cycle to allow clothes to finish drying with residual heat. Also, periodically inspect your dryer vent to ensure it's not blocked. Consider buying a natural gas dryer, the cost per load is less than an electric dryer. Check out [Laundry](http://www1.eere.energy.gov/consumer/tips/laundry.html) for more tips at: (<http://www1.eere.energy.gov/consumer/tips/laundry.html>).

Laundry

About 90% 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.

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.
- Periodically inspect your dryer vent to ensure it is not blocked. This will save energy and may prevent a fire. Manufacturers recommend using rigid venting material, not plastic vents that may collapse and cause blockages.
- Consider air-drying clothes on clothes lines or drying racks. Air-drying is recommended by clothing manufacturers for some fabrics.
- **\$ Long-Term Savings Tip:** Look for the [ENERGY STAR](http://www.energystar.gov/) and [EnergyGuide labels](http://www.energystar.gov/). [ENERGY STAR](http://www.energystar.gov/) (<http://www.energystar.gov/>) clothes washers clean clothes using 50% less energy than standard washers. Most full-sized [ENERGY STAR](http://www.energystar.gov/) washers use 18-25 gallons of water per load, compared to the 40 gallons used by a standard

machine. **ENERGY STAR** (<http://www.energystar.gov/>) models also spin the clothes better, resulting in less drying time.

- **\$ Long-Term Savings Tip:** 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.
- **\$ Long-Term Savings Tip:** **ENERGY STAR** (<http://www.energystar.gov/>) does not label clothes dryers because most of them use similar amounts of energy, which means there is little difference in energy use between models.

Lower Your Lighting Costs

Increasing your lighting efficiency is one of the fastest ways to decrease your electricity bills. 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. Finally, use compact fluorescent lamps (CFLs); they are much more efficient than incandescent bulbs and last 6 to 10 times longer. CFLs are more expensive than incandescent bulbs, but they pay for themselves by saving energy over their lifetime. Check out [Lighting](http://www1.eere.energy.gov/consumer/tips/lighting.html) for more tips at: (<http://www1.eere.energy.gov/consumer/tips/lighting.html>)

Lighting



Compact Fluorescent Bulbs—A Bright Idea! Compact fluorescent bulbs are four times more energy efficient than incandescent bulbs and provide the same light levels.



Save Energy and More--- Halogen lamps generate excessive heat that can create fire hazards. Use compact fluorescent lights in your torchieres or better yet, buy a torchiere designed for compact fluorescent bulbs.



Making improvements to your lighting is one of the fastest ways to cut your energy bills. An average household dedicates 11% of its energy budget to lighting. Using new lighting technologies can reduce lighting energy use in your home by 50% to 75%. Advances in lighting controls offer further energy savings by reducing the amount of time lights are on but not being used.

Indoor Lighting

Use tube fluorescent and energy efficient compact fluorescent lights (CFLs) in fixtures throughout your home to provide high-quality and high-efficiency lighting. Fluorescent lamps are much more efficient than incandescent (standard) bulbs and last about 4 to 10 times longer. Today's CFLs offer brightness and color rendition that is comparable to incandescent lights. Although fluorescent and compact fluorescent lamps cost a bit more than incandescent bulbs, they pay for themselves by saving energy over their lifetime. CFL fixtures are now available that feature dimmers and operate much like incandescent fixtures.

Indoor Lighting Tips

- Look for the [ENERGY STAR](#) label when purchasing these products.
- 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 minifluorescent 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.
- Recessed downlights (also called recessed cans) are now available that are rated for contact with insulation (IC rated), are designed specifically for pin-based CFLs, and can be used in retrofits or new construction.
- Take advantage of daylight by using light-colored, loose-weave curtains on your windows to allow daylight to 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, can produce more light (lumens), and do not get as hot as the halogen torchieres. Halogen torchieres are a fire risk because of the high temperature of the halogen bulb.

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 motion-detector floodlights. Some stores also carry lights powered by small photovoltaic (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 motion sensor so they will turn on only at night or when someone is present. A combined photocell and motion sensor will increase your energy savings even more.
- Turn off decorative outdoor natural gas lamps; just eight such 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 since standard CFLs may not work well below 40°F.
- Also consider high-intensity discharge (also called HID) or low-pressure sodium lights.

Close the Window on High Energy Bills

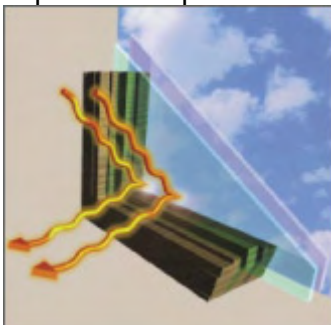
If your home has single-pane windows, as almost half of U.S. homes do, consider replacing them. New double-pane windows with high-performance glass are available on the market. In colder climates, select windows that are gas filled with low-emissivity (low-e) coatings on the glass to reduce heat loss. In warmer climates, select windows with spectrally selective coatings to reduce heat gain. If you decide not to replace your windows, there are other ways to improve their performance. In cold climates, close your curtains and shades at night, and open them during the day. Installing storm windows can also reduce your heat loss, by up to 50%. In warm climates, install white window coverings to reflect heat away from the house, and close south- and west-facing curtains during the day. Check out [Windows](http://www1.eere.energy.gov/consumer/tips/windows.html) for more tips go to (<http://www1.eere.energy.gov/consumer/tips/windows.html>).

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, your air conditioner must work harder to cool hot air from sunny windows. Install [ENERGY STAR](#) windows and use curtains and shade to give your air conditioner and energy bill a break. If you live in the Sun Belt, look into new solar control spectrally selective windows, which can cut the cooling load by 10% to 15%.

If your home has single-pane windows, as almost half of U.S. homes do, consider replacing them. New doublepane 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.

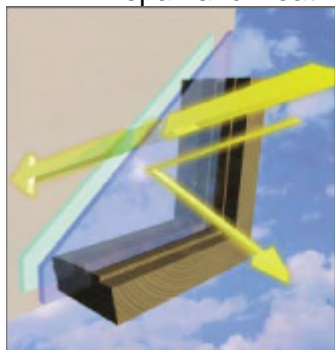
If you decide not to replace your windows, the simpler, less costly measures listed below can improve their performance.



Cold Climate Windows Keep Heat In--- Double-pane windows with low-e coating on the glass reflect heat back into the room during the winter months.

Cold-Climate Window Tips

- 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.
- 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 let in the winter sun.
- Install exterior or interior storm windows; storm windows can reduce 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.



Warm Climate Windows Keep Heat Out--- 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.

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 during the day.
- Install awnings on south- and west-facing windows.
- Apply sun-control or other reflective films on south-facing windows to reduce solar gain.
- **\$ Long-Term Savings Tip:** Installing new, high-performance windows will improve your home's energy performance. While it may take many years for new windows to pay off in energy savings, the benefits of added comfort and improved aesthetics and functionality may make the investment worth it to you. Today, many new window technologies are available that are worth considering. Glazing materials (the glass part of the window) 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 for Windows

- Look for the [ENERGY STAR](#).
- When you're shopping for new windows, look for the National Fenestration Rating Council 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 a 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.
- 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.
- Remember that new windows must be installed correctly to avoid air leaks around the frame. Look for a reputable, qualified installer.

Save Energy Today!

You can take a few simple actions today to save energy. Set your thermostat low in the winter and high in the summer. Install a programmable thermostat to control your home's temperature automatically. Replace incandescent light bulbs with compact fluorescent bulbs. Air dry dishes. Turn off your computer and monitor when not in use. Use power strips and turn them off when equipment is not being used. Lower the thermostat on your water heater to 120 degrees. Take short showers instead of baths. Wash only full loads of dishes and clothes. Drive sensibly and don't speed. Check out [Save Energy and Money Today](http://www1.eere.energy.gov/consumer/tips/save_energy.html) for more tips go to . . .

(http://www1.eere.energy.gov/consumer/tips/save_energy.html)

Save Energy and Money Today

Did you know that the typical U.S. family spends more than \$1,600 a year on home utility bills? Unfortunately, a large portion of that energy is wasted. And electricity generated by fossil fuels for a single home puts more carbon dioxide into the air than two average cars. And as for the road, transportation accounts for 66% of all U.S. oil consumption. The good news is, there is a lot you can do to save energy and money at home and in your car. Start making small changes today (see the tips below). To cut your energy use up to 25%, see the Long-Term Savings Tips throughout this Web site.

The key to achieving these savings in your home 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. Even a top-of-the-line, energy-efficient furnace will burn a lot of fuel if the ducts, walls, attic, windows, and doors are not insulated and leak. Taking a whole-house approach to saving energy ensures that dollars you invest to save energy are spent wisely.

Energy-efficient improvements not only make your home more comfortable, they can yield long-term financial rewards. Reducing your utility bills more than makes up for the higher price of energy-efficient appliances and improvements over their lifetimes. In addition, your home could bring in a higher price when you sell. This booklet shows you how easy it is to reduce your energy use at home and on the road. The easy, practical solutions for saving energy include tips you can use today, throughout your home—from the roof, walls, and insulation that enclose it to the appliances and lights inside. Please, take a few moments to read the valuable tips in this booklet to start saving energy and money today.

Tips to Save Energy Today

Easy low-cost and no-cost ways to save energy.

- Set your thermostat comfortably low in the winter and comfortably high in the summer. Install a programmable thermostat that is compatible with your heating and cooling system.
- Use compact fluorescent light bulbs.
- Air dry dishes instead of using your dishwasher's drying cycle.
- Turn off your computer and monitor when not in use.
- Plug home electronics, such as TVs and DVD players, into power strips; turn the power strips off when the equipment is not in use (TVs and DVDs in standby mode still use several watts of power).
- Lower the thermostat on your hot water heater to 120° F.

- Take short showers instead of baths.
- Wash only full loads of dishes and clothes.
- Drive sensibly. Aggressive driving (speeding, rapid acceleration and braking) wastes gasoline.
- Look for the [ENERGY STAR®](#) label on home appliances and products. [ENERGY STAR®](#) products meet strict efficiency guidelines set by the [U.S. Environmental Protection Agency](#) and the [U.S. Department of Energy](#).

Power Your Home, Naturally, with Renewable Energy

Today, there are more options than ever to use renewable energy at home. A new home provides the best opportunity for taking advantage of passive solar energy. Orient the home to avoid overhead summer sun and to benefit from winter sun in cooler climates. Solar pool heating systems are very efficient and can cut costs for heating swimming pools or hot tubs. The easiest way to take advantage of solar power is to buy electricity generated by renewable sources from your local utility. Under certain conditions, installing PV cells might be right for you. Check out [Renewable Energy](#) for more tips.

Renewable Energy--



Solar-Powered Outdoor Lighting--- You have many options for using renewable energy at home—from solar-powered outdoor lights to buying renewable energy from your utility to even producing solar electricity at home with photovoltaic (PV) cells.

Renewable Energy Tips

- A new home provides the best opportunity for designing and orienting the home to take advantage of the sun's rays. A well-oriented home admits low-angle winter sun to reduce heating bills and rejects overhead summer sun to reduce cooling bills. See the Heating and Cooling section for more about using passive solar energy in your home.
- Many U.S. consumers buy electricity made from renewable energy sources like the sun, wind, water, plants, and Earth's internal heat. This power is sometimes called "green power." Buying green power from the utility is one of the easiest ways to use renewable energy without having to invest in equipment or take on extra maintenance.
- Another use of solar power is for heating water. Solar water heating is covered in the Water Heating section. If you have a swimming pool or hot tub, you can use solar power to cut pool heating costs. Most solar pool heating systems are cost competitive with conventional systems. And solar pool systems have very low operating costs. It's actually the most cost-effective use of solar energy.
- **\$ Long-Term Savings Tip:** If you've made your home as energy efficient as possible, and you have very high electricity bills and a good solar resource, you might want to consider generating your own electricity using PV cells. New products are available that integrate PV cells with the roof, making them much less visible than older systems.

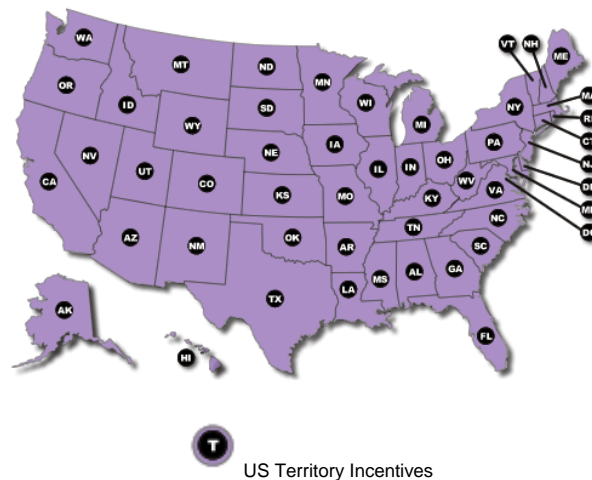
If the following conditions apply, you might want to do more research to see if investing in PV is right for you:

- Your site has adequate solar resources.
- A grid connection is not available in your area or can be made only through an expensive power line extension.
- You want to gain energy independence from your power provider.
- You are willing to pay more up front to reduce the environmental impact of your electricity use.
- Your power provider will connect your system to the electricity grid and buy any excess power you produce.

Your state, city, or utility offers rebates, tax credits or other incentives. Visit

<http://www.dsireusa.org/> to find out about financial incentives in your area. **DSIRE** is a comprehensive source of information on state, local, utility, and federal incentives that promote renewable energy and energy efficiency. Choose one or both databases to search:

<http://www.dsireusa.org/> .



Insulate Your Home against High Energy Bills

A good insulating system can help keep your home warm during winter and cool during summer. 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 roof will resist the transfer of heat.) Consider factors such as your climate, building design, and budget when selecting insulation R-value. The easiest and most cost-effective way to insulate your home is to add insulation in the attic. Check out [Insulation and Air Sealing](#)

(http://www1.eere.energy.gov/consumer/tips/insulation_sealing.html) for more tips read below:

Insulation and Sealing Air Leaks

Checking your home's insulation is one of the fastest and most cost-efficient ways to use a whole house approach to reduce energy waste and make the most of your energy dollars. A good insulating system includes a combination of products and construction techniques that protect a home from outside temperatures—hot and cold, protect it against air leaks, and control moisture. You can increase the comfort of your home while reducing your heating and cooling needs by up to 10% by investing in proper [insulation](#) and [sealing air leaks](#).

Should I Insulate My Home?

The answer is probably "yes" if you:

- Have an older home and haven't added insulation. Only 20% of homes built before 1980 are 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 home, addition, or install new siding or roofing.
- Pay high energy bills.
- Are bothered by noise from outside—insulation muffles sound.



Where to Insulate--- Adding insulation in the areas shown above may be the best way to improve your home's energy efficiency.

Audit Your Home Office for Energy Savings

Working from home is becoming increasingly popular, but office equipment can run up the electricity bills. Look for ENERGY STAR computers, copiers, printers, and fax machines when purchasing new equipment. ENERGY STAR products use about half the electricity of standard equipment. Turn off machines when not in use and make sure power management features are activated. Consider buying a laptop for your next computer upgrade; they use much less energy than desktop computers. Check out [Home Office and Home Electronics](#) for more tips.

Stay Cool This Summer While Saving Energy

If you use air-conditioning, 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 it on. It will not cool your home any faster and could result in excessive cooling and unnecessary expense. If you're shopping for an air conditioner, look for the Energy Star and EnergyGuide labels. Consider a whole-house fan or evaporative cooler if appropriate for your climate. Remember that insulation and sealing air leaks will improve energy performance and comfort in summer by keeping cool air inside.

Check out [Air Conditioners](#) for more tips below;

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 and remove excess humidity.

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.
- 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. Place your room air conditioner on the north side of the house. A unit operating in the shade uses as much as 10% less electricity than the same one operating in the sun.
- Keep in mind that insulation and sealing air leaks will help your energy performance in the summertime by keeping the cool air inside.
- **\$ Long-Term Savings Tip:** If your air conditioner is old, consider purchasing a new, energy-efficient model. You could save up to 50% on your utility bill for cooling. Look for the [ENERGY STAR](#) () and [EnergyGuide labels](#). The shopping guide in the back of this booklet will help you find the right size unit for your needs.

ENERGY STAR:

- **\$ Long-Term Savings Tip:** Consider installing a whole house fan or evaporative cooler if appropriate for your climate. Check out the [Consumer's Guide](#) (http://www.eere.energy.gov/consumer/your_home/space_heating_cooling/index.cfm/mytopic=12300) for more information on efficient cooling.

Consumers Guide: Space Heating and Cooling

Heating and cooling account for about 56% of the energy use in a typical U.S. home, making it the largest energy expense for most homes. A wide variety of technologies are available for heating and cooling your home, and they achieve a wide range of efficiencies in converting their energy sources into useful heat or cool air for your home. In addition, many heating and cooling systems have certain supporting equipment in common, such as thermostats and ducts, which provide opportunities for saving energy.

When looking for ways to save energy in your home, be sure to think about not only improving your existing heating and cooling system, but also consider the energy efficiency of the supporting equipment and the possibility of either adding supplementary sources of heating or cooling or simply replacing your system altogether.

Selecting and Replacing Heating and Cooling Systems

When replacing or upgrading an existing heating and cooling system, it's important to first consider the limitations imposed by your current system and available energy sources. When selecting a heating and cooling system for a new house, your options are generally much wider, although your builder or developer may place limitations on your choices.

Cooling Systems ▶ Depending on where you live, cooling your home can be as simple as opening a window or as complex as using a central air conditioning unit. A wide variety of cooling technologies are available.

Heating Systems ▶ Although most U.S. homes use either a furnace or a boiler, other approaches range from wood stoves to active solar heating systems.

Heat Pump Systems ▶ Heat pump systems provide both heating and cooling and offer the benefit of delivering more useful energy than they consume.

Supporting Equipment for Heating and Cooling Systems ▶ Thermostats and ducts provide opportunities for saving energy. Dehumidifying heat pipes allow central air conditioners and heat pumps to deliver drier air. Electric and gas meters allow you to track your energy use closely.