

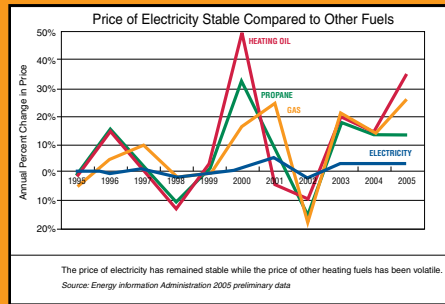
# HOME ENERGY AUDITS



A CHECKLIST TO SAVE YOU  
ENERGY AND MONEY



Whether you're replacing a furnace or water heater, choosing new appliances, or building a new home, how well you use energy has become an increasingly important factor in your decision. Making the right choice can mean big cost savings. But other factors are important too, like size, efficiency and reliability.



That's a lot of information to collect and digest, especially if you need to decide quickly. Wouldn't it be easier if there was someone you could go to for advice? Someone who knows all the options and won't try to sell you on just one?

That's when your local electric cooperative's Energy Advisor can help. As a member-owner of a Touchstone Energy® cooperative, you already have energy professionals who work for you. It's one of the benefits of ownership – being able to call on your employees for expertise. And because they're also your neighbors, they understand your needs and will give you honest, unbiased advice.

You have the power to control your energy costs. It's the power of human connections provided by the Energy Advisors at your local Touchstone Energy® cooperative. And it's there to help you make the best choices both for your family and your community.



A home energy audit is the first step to assessing how much energy your home consumes and to evaluating what measures you can take to make your home more energy-efficient. An audit will show you problems that may, when corrected, save you significant amounts of money over time. During the audit, you can pinpoint where your house is losing energy. Audits determine the efficiency of your home's heating and cooling systems. An audit also may show you ways to conserve hot water and electricity.

### DO-IT-YOURSELF HOME ENERGY AUDITS

You can easily conduct a home energy audit yourself. With a simple but diligent walk-through, you can spot many problems in any type of house. When auditing your home, keep a checklist of areas you have

inspected and problems you have found. This list will help you prioritize your energy-efficiency upgrades.



### LOCATING AIR LEAKS

First, make a list of obvious air leaks (drafts). The potential energy savings from reducing drafts in a home may range from 5 to 30 percent per year, and the home is generally much more comfortable afterward.

- ❑ Check for indoor air leaks, such as gaps along the baseboard or edge of the flooring and at junctures of the walls and ceiling.
- ❑ Check for drafts at these places:
  - Electrical outlets
  - Switch plates
  - Window frames
  - Baseboards
  - Weatherstripping around doors
  - Fireplace dampers
  - Attic hatches
  - Wall- or window-mounted air conditioners



- ❑ Look for gaps around pipes and wires, electrical outlets, foundation seals, and mail slots. Check to see if caulking and weatherstripping are applied properly, leaving no gaps or cracks, and in good condition.

- ❑ Inspect windows and doors for air leaks. See if you can rattle them, since movement means possible air leaks. If you can see daylight around a door or window frame, then it leaks. You usually can seal these leaks with caulk or weatherstripping.
- ❑ Check storm windows to see if they fit and are in good condition. You also may wish to consider replacing your old windows and doors with newer, high-performance ones. If new factory-made doors or windows are too costly, you can install low-cost plastic sheets over the windows.
- ❑ If you are having difficulty locating leaks, you may want to conduct a basic building pressurization test.
  1. First, close all exterior doors, windows, and fireplace flues.
  2. Turn off all combustion appliances such as gas-burning furnaces and water heaters.
  3. Then turn on all exhaust fans (generally located in the kitchen and bathrooms) or use a large window fan to draw air out of the rooms.

This test increases air flow through cracks and leaks, making them easier to detect. You can use smoking incense sticks or your damp hand to locate leaks. If you use incense sticks, moving air will cause the smoke to waver. If you use your damp hand, drafts will feel cool.



- ❑ Inspect all areas on the outside of your house where different building materials meet, including:
  - All exterior corners
  - Where siding and chimneys meet
  - Areas where the foundation meets the bottom of exterior brick or siding
- ❑ Plug and caulk holes around faucets, pipes, electrical outlets, and wiring.
- ❑ Look for cracks and holes in mortar, the foundation, and the siding, and seal them with the appropriate material.
- ❑ Check the exterior caulking around windows, exterior doors, and storm doors.







### ADEQUATE VENTILATION

When sealing any home, you must always be aware of the danger of indoor air pollution caused by the “backdrafting” of appliances that burn fuel. Backdrafting occurs when the various fuel-burning appliances and exhaust fans in the home compete for air. An exhaust fan may pull the combustion gases from the appliances back into the living space. This can create a dangerous and unhealthy situation in the home.

In homes where fuel is burned (i.e., natural gas, fuel oil, propane, or wood) for heating, be certain the appliance has an adequate air supply. Generally, one square inch of vent opening is required for each 1,000 British thermal units (BTUs) of appliance input heat. Some furnaces are sealed units that do

not have this requirement. When in doubt, contact a professional heating and cooling contractor.

### INSULATION

Heat loss through the ceiling and walls in your home could be significant if the insulation levels are less than the recommended minimum. When your house was built, the builder likely installed the amount of insulation recommended at that time. Given today’s energy prices (and future prices that probably will be higher), the insulation level might be inadequate, especially if you have an older home.

- ❑ If the attic hatch is located above a heated or air-conditioned space, check to see if it is at least as heavily insulated as the attic, is weather-stripped, and closes tightly.

### THE R-VALUE OF INSULATION

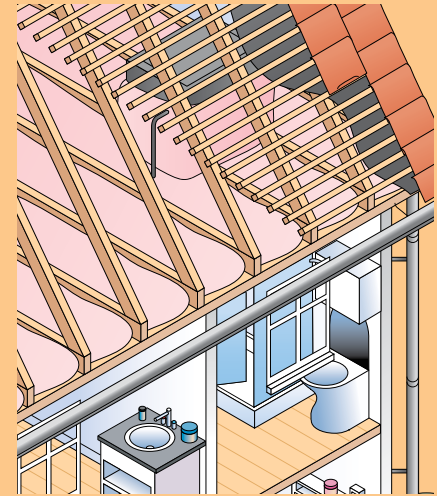
An R-value indicates an insulation’s resistance to heat flow. The higher the R-value, the greater the insulating effectiveness.

The R-value depends on the type of insulation and includes its material, thickness, and density. When calculating the R-value of a multilayered installation, add the R-values of the individual layers. Installing more insulation in your home increases the R-value and the resistance to heat flow.

The effectiveness of an insulation’s resistance to heat flow also depends on how and where the insulation is installed. For example, insulation that is compressed will not provide its full rated R-value. The overall R-value of a wall or ceiling will be somewhat different from the R-value of the insulation itself because some heat flows around

the insulation through the studs and joists. Therefore, it’s important to properly install your insulation to achieve the maximum R-value.

The amount of insulation or R-value you’ll need depends on your climate and the building design. Many state and local codes include minimum requirements for insulation.



- ❑ In the attic, determine whether openings for ducts, pipes, and chimneys are sealed. Seal any gaps with an expanding foam caulk or some other permanent sealant.
- ❑ While you are inspecting the attic, check to see if there is a vapor barrier under the attic insulation. The vapor barrier might be tar paper, kraft-paper backing on fiberglass batts, or plastic sheeting. If there does not appear to be a vapor barrier, you might consider painting the

interior ceilings with vapor-barrier paint. This reduces the amount of water vapor that can pass through the ceiling. Moisture can reduce the effectiveness of insulation and promote structural damage.

- ❑ Make sure the attic vents are not blocked by insulation.
- ❑ Seal any electrical boxes in the ceiling with flexible caulk (from the living-room or attic side) and cover the entire attic floor with at least the currently recommended amount of insulation.

❑ Checking a wall's insulation level is more difficult. Select an exterior wall and turn off the circuit breaker or unscrew the fuse for any outlets in the wall. Be sure to test the outlets to make certain that they are not "hot" by plugging in a functioning lamp or radio. Once you are sure the outlets are not getting electricity, remove the cover plate from one of the outlets and gently probe into the wall with a screwdriver or long thin stick. If you encounter slight resistance, you have some insulation there. You also could make a small hole in a closet wall, behind a couch, or in some other unobtrusive place to see what is in the wall cavity. Ideally, the wall cavity will be totally filled with some form of insulation material. Unfortunately, this method will not tell you if the entire wall is insulated, or if the insulation has settled. Only a thermographic inspection can do this.

❑ If your basement is unheated, determine whether there is insulation under the living area flooring. In most areas of the country, an R-value of 19 is the recommended minimum level of insulation. "R-value" is a standard used to measure the ability of an insulating material to impede the flow of heat.

❑ The insulation at the top of the foundation wall and first floor perimeter should have an R-value of 10 or greater. If the basement is heated, the foundation

walls should be insulated to at least R-19.

❑ Your water heater, hot water pipes, and furnace ducts should all be insulated.

#### HEATING/COOLING EQUIPMENT

❑ Inspect heating and cooling equipment annually, or as recommended by the manufacturer. Have a professional check and clean your equipment once a year.

❑ If you have a forced-air furnace, check your filters and replace them as needed. Generally, you should change them about once every month or two, especially during periods of extended use.

❑ If the unit is more than 15 years old, you should consider replacing your system with one of the newer, energy-efficient units. A new unit can reduce your energy consumption, especially if the existing equipment is in poor condition. Ask the Energy Advisor at your local electric cooperative



for information on air-to-air heat pumps and geothermal systems. Both types of heating and cooling systems are extremely energy-efficient and can save you money on energy bills.

❑ Check your ductwork for dirt streaks, especially near seams. These indicate air leaks, and they should be secured with a duct sealant. Insulate any ducts or pipes that travel through unheated spaces. An insulation R-value of 6 is the recommended minimum.

#### LIGHTING

❑ Energy for lighting accounts for about 10 percent of your electric bill. Consider replacing some of your incandescent light bulbs with compact fluorescent lamps (CFLs). These bulbs use about 25 percent of the wattage of a

similarly-sized incandescent bulb. CFLs last much longer and give off less heat.







## LOW-COST / NO-COST WAYS TO CUT ENERGY COSTS NOW

Want some simple, easy ways to cut your energy bills right now? Follow these simple tips:

### KITCHEN

- ❑ Air-dry dishes instead of using the dishwasher's heating cycle.
- ❑ Use your microwave instead of a conventional oven.

### ELECTRONICS

- ❑ Turn off your computer and monitor when not in use.
- ❑ Turn power strips off when equipment is not in use.

### APPLIANCES

- ❑ Lower the thermostat on your water heater to 120° Fahrenheit (F).

- ❑ Avoid over-drying clothes and be sure to clean the lint filter before each drying cycle.
- ❑ Clean your refrigerator coils. Dirty coils cause your refrigerator compressor to work harder to remove heat.

### WATER USAGE

- ❑ Take showers instead of baths to reduce hot water use.
- ❑ Consider installing a thermal wrap on your electric water heater.
- ❑ Avoid overfilling your washer. It can increase your energy use.
- ❑ Wash only full loads of dishes and clothes.

### HEATING

- ❑ Use extra blankets or quilts to allow for a lower nighttime temperature setting.
- ❑ Lower the room temperature while you're sleeping or when no one is home. Your Energy Advisor can help you choose the temperatures that are most cost-effective for your heating system.
- ❑ When your fireplace is not in use, be sure to close the flue tightly to avoid heat loss up the chimney.
- ❑ Seal whole-house attic fans during the winter.

### LIGHTING

- ❑ Make it a habit to turn off lights in unoccupied rooms.

## PROFESSIONAL HOME ENERGY AUDITS

If a do-it-yourself home energy audit isn't for you, you might consider hiring a professional energy auditor. An energy auditor uses a variety of techniques and equipment to determine the energy efficiency of a structure.

Thorough audits often use equipment such as blower doors, which measure the extent of leaks in your home, and infrared cameras, which reveal hard-to-detect drafts and missing insulation.

Professional energy audits generally go into great detail. The energy auditor should do a room-by-room examination of the residence, as well as a thorough analysis of past utility bills.

If you choose to have a professional home energy audit, check with the Energy Efficiency Office of the Ohio Department of Development to identify an organization that performs audits in your area.

Call your Energy Advisor at your local electric cooperative to discuss home energy audits and what might be best for you.



## BLOWER DOOR TEST

Professional energy auditors use blower door tests to help determine a home's airtightness.

These are several reasons to improve a home's air tightness:

- Reducing energy consumption due to air leaks
- Avoiding moisture condensation problems
- Avoiding uncomfortable drafts caused by cold air leaking in from the outdoors
- Making sure the home's air quality is not contaminated by indoor air pollution

### DIAGNOSTIC TOOLS

Testing the airtightness of a home using a special fan called a blower door can help ensure that draft-sealing work is effective. Often, energy efficiency incentive programs, such as the Department of Energy/Environmental Protection Agency's Energy Star® Program, require a blower door test (usually performed in less than an hour) to confirm the tightness of the house.

### HOW IT WORKS

A blower door is a powerful fan that mounts inside the frame of an exterior door. The fan pulls air out of the house, lowering the air pressure inside. The higher outside air pressure then flows in through all unsealed cracks and openings. The energy auditor may use a smoke puffer to detect air leaks.

These tests determine the air-infiltration rate of a building.

Blower doors consist of a flexible frame that you can place in a doorway, a variable-speed fan, a gauge to measure the pressure differences inside and outside the home, an airflow meter, and hoses for measuring airflow.

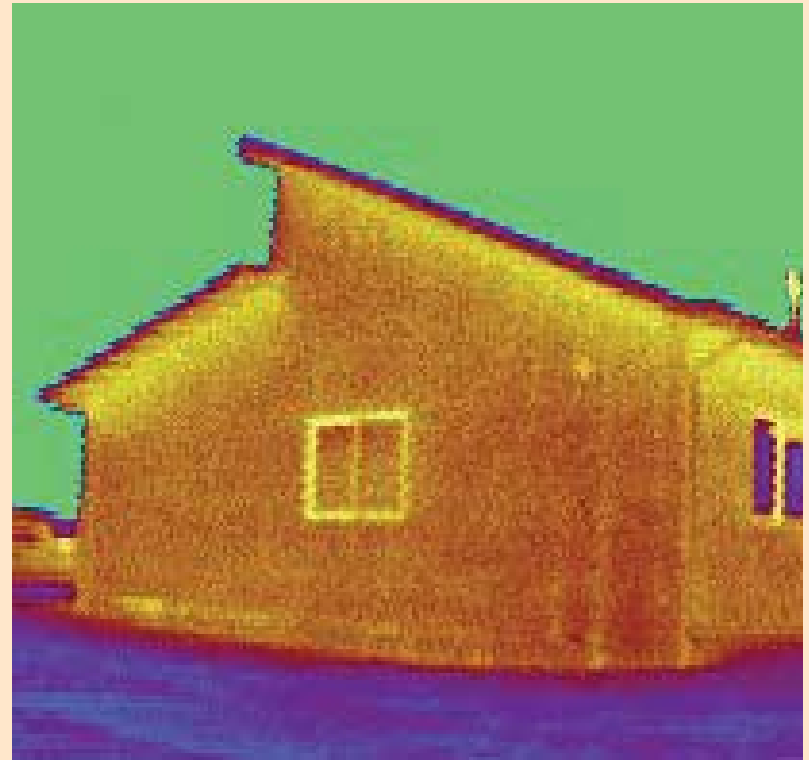
There are two types of blower doors: calibrated and uncalibrated. It is important that the auditor use a calibrated door. This type has several gauges that measure the amount of air pulled out of the house by the fan.

Uncalibrated blower doors can only locate leaks in homes. They provide no method for determining the overall tightness of a building. The calibrated blower door's data allows the auditor to quantify the amount of air leakage and the effectiveness of any leak-sealing job.



Blower door test

Photo courtesy of The Energy Conservatory



Infrared scan of a home

Photo courtesy of Department of Energy/National Renewable Energy Laboratory

## THERMOGRAPHIC INSPECTIONS

An energy auditor may use thermography (infrared scanning) to detect insulation defects and air leaks in your home.

### HOW IT WORKS

Thermography measures surface temperatures with infrared video or still cameras. These tools see

light that is in the heat spectrum. Images on the video or film record the temperature variations of your home's exterior surface, ranging from white for warm areas to black for cooler areas. The resulting images help the auditor determine whether insulation is needed. They also serve as a quality-control tool, for ensuring that insulation has been installed correctly.





**YOUR ELECTRIC COOPERATIVE IS A  
TOUCHSTONE ENERGY® COOPERATIVE.**

Touchstone Energy® is an alliance of more than 600 cooperatives in 46 states that offers reliable power, a strong local presence, and the expertise and resources of a nationwide network of energy professionals.

Your Touchstone Energy® electric cooperative is there for you when you have questions or need information. Call the Energy Advisor at your local cooperative to learn how you can use energy wisely and save money too!

