

Guide to Home Energy Assessments

A home energy assessment is the essential first step to lowering your energy bills.

Why Have a Home Energy Assessment?

A proper home energy assessment (also called a home energy audit) will tell you how much energy you use in your house, the most cost-effective measures you can take to improve the energy efficiency of your home, and how to save money on energy bills.

Do-It-Yourself Home Energy Assessment

You can conduct a simple home energy inspection yourself, or hire a professional for a comprehensive analysis. The DIY assessment involves a simple but diligent walk-through of your home during which you carefully look at the primary areas where air leaks occur:

- Look at places where different materials, such as brick and wood siding, meet - between foundation and walls, and between chimney and siding.
- Inspect the area around electrical outlets, switch plates, windows and door frames, baseboards, attic hatches, wall or window-mounted air conditioners, mail chutes, electrical and gas service entrances, cable TV and phone lines, and vents and fans.
- Check to see that caulking and weather stripping are applied properly and are in good condition.



A home energy assessment involves checking your home for areas (indicated by stars in the above picture) where you can save energy and money.

Other DIY Air Leak Detection Methods

You can also detect air leaks by shining a flashlight over potential gaps at night. You will need a partner to observe the house from outside for large gaps or cracks that will show up as rays of light. This method may not locate small gaps. You can also detect air leaks by shutting a door or window on a piece of paper. If you can remove the paper without tearing it, you have an air leak.

Professional Home Energy Assessment

The professional home energy assessment is usually a much more detailed and quantitative evaluation of the energy efficiency of a house (or any building). The energy auditor uses special equipment to measure the rate of air flow between the inside and outside of the house.

Depressurization Test

If you have difficulty locating air leaks, try conducting a basic building depressurization test (ideally on a cool, windy day).

1. Close all exterior doors, windows, and fireplace flues.
2. Turn off all combustion appliances, including gas burning furnaces and water heaters.
Note: If you do not wish to turn off your furnace, you can omit step 2 and go to step 3.
3. Turn on all exhaust fans that blow air outside, such as bathroom fans or stove vents.
4. Light a smoke candle or incense stick and pass it around the edges of common leak areas. If smoke is drawn into or out of a room, then there is an air leak.

Finding a Certified Provider

Make sure you use a certified energy auditor. Such auditors are typically licensed contractors in the home building and remodeling industry with experience installing heating and cooling systems, windows, and lighting. To find a certified auditor, check with your local electric or gas utility provider, your local state or local government energy or weatherization office, or follow the ENERGY STAR® link under *Further Reading*.

Preparing for an Assessment

Before the energy auditor arrives, make a list of any existing indoor problems you have noticed, such as condensation and uncomfortable or drafty rooms. Have copies or summaries of recent energy bills to share with the auditor. The auditor should do an initial walkthrough of your home to determine daily energy usage patterns, both overall and in specific rooms.

Assessment Techniques and Equipment

The two most common techniques for carrying out a home energy assessment include the blower door test and a thermographic (infrared camera) scan, which are often done together. During the course of the assessment, the auditor may also inspect your heating and cooling systems, test for natural gas leaks, and check to see if your home is properly ventilated.

Blower Door Test

The blower door test is designed to measure the airtightness of a house. A powerful fan called a blower door is mounted into a flexible panel and frame that fits in a doorway. The fan draws air out of the house, resulting in lower pressure inside the house.

This allows outdoor air to flow in through unsealed gaps and other unwanted openings. Using a smoke pencil, the auditor can then determine the location of air leaks.

Make sure the auditor uses a calibrated blower door. A calibrated blower door is connected to a pressure gauge called a manometer that measures the pressure difference between two locations as the fan is running. This results in a quantitative measurement of the air flow through the house. Uncalibrated blower doors can identify air leaks in the home, but not the amount of air leakage.

The auditor may also use a duct blower, a variable speed fan attached to a duct system with a hose to measure the amount of air leakage within ductwork.

Thermographic Scan

A thermographic scan involves the use of an infrared scanner to detect differences in temperature in a building, in particular along walls, roofs, and around windows and doors. These differences show up in a video or camera still image as whiter (warmer) or darker (cooler) areas. Auditors use the images to determine the location of air leaks. When done together with a blower door test, air leaks show up as black streaks in the infrared image.

After the Assessment

Once the assessment is completed, the energy auditor should provide you with a report of the findings and recommendations for improvements. You can make an informed decision about what upgrades to make to your home, based on these findings. You may only need to air seal small gaps and add attic insulation. Or it may be

cost-effective for you to make more substantial upgrades, such as replacing heating and cooling equipment.

Cost & Financials

A professional home energy assessment can cost from approximately \$100 to \$500. Many contractors will perform the assessment at a reduced rate provided that you hire them to carry out subsequent upgrades. Tax rebates for assessments are available to lower income families, and the U.S. Department of Energy's Weatherization Assistance Program also provides states with funding to help low income families weatherize their homes. There are also tax credits and incentives for switching to energy-efficient products. Please see below for more information.

Further Reading

DOE Weatherization Assistance Program
www.eere.energy.gov/wip/wap.html

Energy Savers: Home Energy Assessments
www.energysavers.gov/energy_assessments

Home Performance with ENERGY STAR Locations
www.energystar.gov/index.cfm?c=home_improvement.hm_improvement_hpwes_partners

Financial Incentives

Tax credits, incentives and rebates may be available in your area. Please visit www.energysavers.gov/taxcredits for more information.