



KY-A-Syst for the Home

Environmental Stewardship for Homeowners

Heating and Cooling Systems: Saving Energy and Staying Safe

Why Should You Be Concerned?

Your home needs to be a safe, comfortable, and durable place to live. It also should be affordable, but a house is affordable only when heating and cooling costs are reasonable. The most efficient homes are tightly air-sealed and properly insulated, with all mechanical systems working properly.



How Can KY-A-Syst Help?

This publication leads you through an evaluation of your home and property to determine pollution and health risks. After you have read this publication, walk around your home and property and answer the questions in the boxes, circling the answers that best apply. Your answers will help you become familiar with your home's heating and cooling system and identify potential problems so you can heat and cool your home safely and economically. If you answer all questions with choice A, you have few risks associated with your heating and cooling system and/or its maintenance. If you answer any question with choice B, there may be a problem. If you answer any question with choice C, you will want to consider making changes. Use the action checklist in this publication to help you.

If you would like further help in assessing your heating and cooling system, please contact your county office of the Cooperative Extension Service.

Proper Venting for Combustion Appliances

If your furnace, wood stove, boiler, or water heater burns gas, oil, wood, or coal, it is important that the venting system, which carries combustion gases out of the house, is functioning properly. Vents and flues should be checked annually to make sure they are in good working order because improper maintenance can lead to problems such as blocked vents and cracked flues.

The three types of venting systems are:

- natural draft.
- power vented.
- sealed combustion.

Natural-draft appliances vent into a vertical flue and have a draft hood that draws extra indoor air into the flue. Natural-draft appliances are susceptible to back drafting, which pulls dangerous combustion by-products into the house instead of out the vent. Power-vented and sealed-combustion systems rarely have back

draft. Unvented appliances, including gas fireplace logs, should be used only in well-ventilated areas. If you use an unvented appliance, open a window in the room at least 1 inch.

It is important to maintain your chimney or flue so that combustion by-products are removed efficiently from your home. Inspect your chimney or flue annually and keep a record of its condition. It will be valuable information for you as a homeowner, especially if you decide to sell your home.

Combustion Appliances Need Air

The National Fire Protection Association (NFPA) codes or more strict local codes must be followed to ensure safe installation and operation of combustion equipment. Sealed-combustion units draw air directly from outside the home, but natural-draft and power-vented units draw air from the indoor space in which they are located. For safe operation, it is critical that combustion appliances have enough air, so do not crowd the air space an appliance needs to work properly.

Are proper venting systems installed on all combustion appliances?

- A. All combustion appliances have sealed-combustion venting systems.
- B. Some combustion appliances use natural-draft ventilation.
- C. Unvented space heaters or gas logs are used, *or* vent pipes are showing signs of damage, *or* rust or carbon is present on top of an appliance or below the draft hood.

What is the condition of your chimney or flue?

- A. The chimney or flue is inspected annually.
- B. The chimney or flue has been inspected only once in the past five years.
- C. The chimney or flue has not been inspected, or the inspection record is unknown.

Do your appliances get enough air?

- A. Combustion equipment is in a well-ventilated space or a basement with adequate air for combustion.
- B. Combustion equipment is in a well-sealed basement.
- C. Combustion equipment is in a small space, and openings are blocked.

Energy Consumption

The amount of energy consumed in your home depends on many factors, including:

- how well the home is insulated.
- the efficiency of appliances and equipment.
- the local weather and climate.
- your lifestyle.

The best and most accurate way to determine the energy efficiency of your home is to have a home energy audit or similar service done by a professional. Without an audit, it is not easy to know if your energy consumption is too high. Contact your local utility to see if it offers an energy audit for houses similar to yours. If this service is not available, inquire about a monthly payment plan that would indicate the average energy consumption for a house in your location.

Use the steps below to calculate and evaluate your energy consumption:

Are Your Energy Costs Too High?

1. Total all heating and cooling bills for the past year (12 months). = _____
2. Divide this figure by 12. = _____
3. This is your average monthly energy bill. = _____
4. Average monthly energy bill for energy-efficient houses similar to yours. = _____

If the amount in step 3 is greater than the amount in step 4, it may indicate that your home is using more energy—and has higher energy costs—than it should. By increasing energy efficiency, you can decrease your bills and realize significant savings.

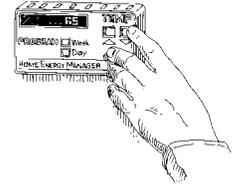
Energy Efficiency

If your primary heating and cooling unit is 15 to 25 years old, it is probably not very energy efficient. Even if it still works, you may benefit by replacing it with a new energy-efficient model. A new heating and cooling unit can pay for itself in fuel savings in only a few years. If you decide to replace your old unit, make sure you dispose of it properly.

All machines work more efficiently—and more safely—if they are inspected and maintained. Your heating and cooling equipment should be checked and serviced every year by a qualified professional. Monthly maintenance is recommended during the season for heating or cooling. If you have a forced-air system, it includes an air filter. You should change or clean your air filter regularly to remove dust and debris before it reaches the air blower and heat-exchange coils and reduces efficiency.

Your Thermostat

One of the easiest ways to save energy is to set a thermostat at a lower temperature in winter and a higher temperature in summer so that the heating and cooling system runs less often. Digital or clock thermostats can be set to adjust the temperature in your house automatically. The newest kind of residential thermostat, a home energy manager, allows many temperature settings throughout the week. Depending on your lifestyle, these programmable thermostats can pay for themselves in energy savings in as little as one or two years.



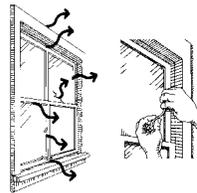
Digital or clock thermostats can be programmed to adjust the temperature automatically.

Distributing Air Efficiently

Unless there is a heating and cooling unit in each room, you probably have a system to distribute hot or cool air from a central heater or air conditioner. If the duct system used to move warm or cold air throughout the house leaks, it can waste large amounts of energy. Any ductwork located in an unheated space (such as an attic or crawlspace) has a high potential for heat loss. Ducts in such spaces should be insulated. Also, duct joints should be properly sealed to make sure all the warm or cool air gets where you want it to go.

Windows, Doors, and Leaks

Air leaks in your attic can allow large amounts of outside air to enter your home, which can contribute to a large portion of a home's total heat loss. To prevent this loss, find leak points and seal them. Some openings, such as open windows and doors, are obvious pathways for air entry. Others, such as cracks around window frames, are unintended pathways for leaks. This air leakage is often the primary cause of heat loss from windows and doors. Seal leaks with caulking and weatherstripping, as shown at left. For more information on sealing air leaks, contact the Cooperative Extension Service in your county.



Seal window leaks with caulking and weatherstripping.

Insulation

Even if you air-seal your home, you will need insulation to prevent transfer of heat or cold air through the walls, floors, or ceiling. Insulation materials are assigned an R-value, which measures how well they resist the flow of heat energy into or out of your home. The larger the R-value, the more heat or cool air stays where you want it to. The amount of insulation for a home varies with geographic location. Your local building supplier should be able to recommend the level of insulation you need.

Water Heater Temperature

Heating of water is the next largest energy user after the heating and cooling of your home. The simplest thing you can do to save energy when you heat water is to turn down the water heater temperature. Each 10-degree reduction will save you 3 to 5 percent annually on your water heating bill. Lowering the water temperature will also increase the lifetime of your water heater and reduce the chance of someone being burned by the hot water, especially children and the elderly, who are most at risk. Water heater thermostats are not always accurate, so you may want to test the water temperature by placing a kitchen thermometer in a cup of hot water for a minute or more.

Insulating Your Water Heater

Wrapping your water heater with insulation can reduce the energy used to heat water by 4 to 9 percent. The addition of insulation usually pays for itself in less than a year. Water heater insulation blankets are widely available at hardware stores and come in standard sizes to fit 40-, 60-, and 80-gallon water heaters. Follow the manufacturer's instructions for installation. Some new water heaters come with high levels of foam insulation and will not need more insulation.

Conserving Hot Water

Reducing the hot water use in your home will reduce the energy consumed. To lower hot water use, fix any leaking pipes and consider installing low-flow shower heads. Not only will you conserve water, but you will conserve energy used to heat the water.

How old is your heating and cooling equipment?

- A. My equipment is less than 5 years old.
- B. My equipment is 5 to 15 years old.
- C. My equipment is more than 15 years old.

Is your heating and cooling system receiving proper maintenance?

- A. The air filters are changed every month during use, and equipment is serviced at least every two years.
- B. The filters are changed occasionally, and the system is maintained on an irregular basis.
- C. The filters are not changed or are rarely changed, and the system is not maintained.

Does your thermostat save energy?

- A. A modern thermostat with a variable temperature program is installed. It is routinely used to minimize energy consumption.
- B. A newer thermostat is installed, but it is not used to regulate temperatures at night or when the house is empty.
- C. An older thermostat is in use. It is set to maintain a constant temperature.

Is your ductwork protected?

- A. All ductwork is located in a heated/cooled space, or ductwork in unheated space is insulated.
- B. Some ductwork is located in unheated space and is not insulated.
- C. All ductwork is located in unheated space, and none is insulated.

Is your attic sealed against leaks?

- A. All potential leak points are sealed or weather-stripped.
- B. Only some potential leak points are sealed.
- C. Most potential leak points are not sealed.

Are your windows and doors sealed against leaks?

- A. All windows and doors are sealed with caulk and weatherstripping and tested for leaks. Newer, well-sealed, double-pane windows are installed.
- B. Only some windows and doors are caulked and weather-stripped. Older or leaky storm windows are used. Some windows are sealed in winter with plastic sheets.
- C. Windows are older and not sealed. Some windows may not have storm windows.

How well are your walls insulated?

- A. Wall cavities are insulated with loose fill or 3-inch to 5-inch batt, according to regional recommendations.
- B. Walls are insulated below regional recommendations.
- C. There is no insulation in wall cavities.

At what temperature is your water heater set?

- A. The thermostat is set at 120°F.
- B. The thermostat is set at 130°F.
- C. The thermostat is set at 140°F or higher.

Is your water heater insulated?

- A. A new, highly insulated water heater or water heater blanket is installed.
- B. An older water heater with a torn insulation blanket is installed.
- C. An older water heater with no added blanket is used.

What efforts do you make to conserve hot water?

- A. Low-flow shower heads are installed, and there are no leaking faucets. Effort is made to conserve hot water.
- B. There are no leaking faucets. Hot water use is minimized.
- C. There are leaking faucets, and no low-flow fixtures are installed.

For More Information About . . .

- **Energy Consumption/Home Energy Audit**
 - Your utility company (check local listing).
- **Energy Efficiency**
 - Energy Efficiency and Renewable Energy Network (EREN) (call 1-800-363-3732 or visit the network's Web site at <<http://www.eren.doe.gov>>, where you can find information on a variety of topics).
- **Cooperative Extension Service** (check local listing).



Home 'A' Syst

What Is the KY-A-Syst for the Home Program?

The KY-A-Syst for the Home program is a series of publications that can help you be a good environmental steward and protect the health and well-being of your family. KY-A-Syst for the Home publications provide problem-solving information and also list agencies that can provide help in specific areas.

Action Checklist

Look back at the assessment questions and make sure you have answered all questions. Record all B and C responses, and list the improvements or changes you plan to make. You can use recommendations from this publication or from other sources to help you decide on action you are likely to take. Write down a date to keep you on schedule. Read back through the assessment questions from time to time to see if any responses have changed, and take any action needed to address new concerns.

Write all B and C responses below.	What can you do to reduce risk?	Set a target date for action.
<i>Sample:</i> The chimney or flue has not been inspected, or the inspection record is unknown.	Contact a professional to inspect the chimney or flue.	One week from today: March 8.

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This publication is based on *Home*A*Syst: An Environmental Risk-Assessment Guide for the Home* developed by the National Farm*A*Syst/Home*A*Syst Program (author Lori S. Marsh, Virginia Polytechnic Institute and State University) in cooperation with NRAES, the Northeast Regional Agricultural Engineering Service. Permission to use these materials was granted by University of Wisconsin, the copyright holder. Kentucky's modification of Home*A*Syst was coordinated by Kimberly Henken, Amanda Abnee, and Marla Hall. Technical editing was provided by Maurice Hendrick. This material is based upon work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under special project number 99-EWQI-10515.

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