

## **Basic Home Energy Audit**

The purpose of this information is to help you perform your own basic home energy audit. Improved energy efficiency can contribute to lower bills, increased comfort, lower utility rates, and environmental conservation.

An energy audit does not have to be difficult or intimidating. A simple review of the home can identify numerous areas that, if improved, will lead to efficient operations. The following audit outline deals with no cost or low cost ways to improve your energy efficiency.

### **Before You Get Started**

Before you get started, we need to qualify a few things. First, understand that this audit information is intended to be general in nature. There are many energy issues in any home. It is almost impossible to address them all.

It is important to take care of what you can. You should only look at making improvements to your home's comfort and efficiency if they make economic sense for your situation. If the cost of making an improvement is high and the benefit low, you can't afford to do it.

City of Ames Electric Services makes no guarantee that if you perform your own energy audit that you will save money. Generally, if you reduce the amount of energy you waste, you will reduce your bills.

### **Two Overriding Ideas**

Essentially, there are two overriding ideas that should be your guide for improving your comfort and energy efficiency.

- *Heat moves from the warm side of a barrier to the cold side.* This means that your home loses heat in the winter and gains it in the summer. The goal is to block this heat movement if you can.

All materials resist the movement of heat to some extent. The higher the **R**esistance to heat movement, the higher the **R**-value. We try to build into our homes the highest R-value we can. This is where insulation can help.

- *Air infiltration can be a home's biggest energy waster.* All of the holes, gaps, and cracks in a home's walls, ceiling, and foundation are areas where there is no resistance to heat movement. The goal is to plug as many of these leaks as you can.

### **Not All Homes, Or People, Are Alike**

Some homes may already have adequate amounts of insulation. In some, you won't know if you have insulation or not. Not all homes have crawlspaces, or ducts in unconditioned (no heating or air conditioning) areas. Comfort or health issues may make changes difficult.

### **Practice, Practice, Practice**

Your main goal for an audit should be to do what you can. *Any* improvements you make will help. The time to worry about energy efficiency is not when you are holding a high bill in your hand. Be a student of efficiency year round. Get to know your home and your energy habits, find information on what can be done to improve your use of energy, and then practice.

### **Home Heat Loss Quiz**

One suggestion before performing an audit. It is important to first understand a little bit about your home's current level of efficiency and where you may need help. A good start would be to take the IAMU Home Heat Loss Quiz included with the packet.

### **Audit Layout**

The audit covers 12 areas or categories. You may, or may not, have all 12. In each category there is general information, a description of what to look for, and suggestions. At the end of the category there is a check off indicating whether you currently have a particular energy item, and an area for an action.

If you identify an area where you are lacking, jot down an action like, "Call insulation company and get a quote on insulating side walls.", or "Install an insulated jacket on my water heater,", or "Call the Energy Guy and ask about..." You get the idea. The point is to move forward with making changes that will result in improving your energy efficiency.

There is also an *Energy Audit Worksheet* included that allows you to take notes about your home as you do the audit.

# The Audit

## 1. SIDE WALL INSULATION

The first question to ask is, “Do you know if you have side wall insulation?” If you do, there is nothing to do here. Move on to the next item.

If you do not have wall insulation and you are interested in adding some, contact a professional insulation installer (you can find them in the Yellow Pages under insulation), for an estimate. Remember, if you have a choice between attic or wall insulation, insulate your attic. You get more savings.

- Walls without insulation can be insulated in various ways. Possibly, the simplest is to drill holes in the home’s siding, and blow insulation through the holes into the wall space. A plug is placed into the hole to prevent weather infiltration.

If you don’t know if your walls are insulated you may be able to find out by trying a simple test. Take off an exterior wall switch plate (either plug or light switch). If there is a small gap between



the electrical wiring box and the wall, look to see if insulation is visible.

Wall insulation? Y\_\_ N\_\_ Action: \_\_\_\_\_

## 2. EXTERIOR SWITCH PLATES

While you are evaluating your exterior walls for insulation, you can check for switch plate insulation. Air can leak into and out of a home through switch boxes (plugs, light switches) in your home’s outer walls. Switch boxes usually don’t seal well. Placing a foam gasket behind the switch cover can help plug this leak. These gaskets may be purchased at a hardware or lumber store.



Switch plate gaskets? Y\_\_ N\_\_ Action: \_\_\_\_\_

## 3. ATTIC INSULATION

The first question to ask is, “Do you know if you have attic insulation?” If you do, the next question is, “How much is there?” If you have attic insulation, and it is 12” – 14” deep, there is nothing to do here. Move on to the next item.

If you do not have attic insulation, or the depth is 6” – 8” or less, and you are interested in adding some, contact a professional insulation installer (you can find them in the Yellow Pages under insulation), for an estimate. Remember, if you have a choice between attic or wall insulation, insulate your attic. You get more savings.

- Attics can be insulated in various ways, and with various materials. Some common types of insulation are fiberglass rolls (batts), fiberglass loose fill, and cellulose loose fill.
- Some insulation materials like cellulose can be dumped into an attic, but more commonly is applied with a blower machine. Blower machines may be rented, however, if you are not comfortable with performing this on your own, contact an insulation professional

If you don't know if your attic is insulated, try to find your access door and check. Use a ruler to measure the depth. If you don't know where your access door is located, or don't have one, contact an insulation professional to check for you.

Remember to insulate and weather-strip your attic access door.



Attic insulation? Y\_\_ N\_\_ Action: \_\_\_\_\_

#### **4. WINDOWS**

Windows can be a large energy waster. You want to ensure that you're getting the best performance out of what you have. Because glass has a very low resistance to heat movement, your goal here is to reduce air infiltration. You also want to take advantage of shading at the appropriate times.

Make sure the window seals well. If the window is loose in its track, install some weather stripping to tighten it up.

If you have cracked or missing panes have them replaced.

If you notice cracks between the wall and window molding, apply caulk to plug this leak.



If you have shades, open them on sunny winter days to gain solar heat. Close them on hot sunny days to reduce solar heat gain.

If you have storms, use them during heating and cooling season.

During cold winter weather, use clear plastic window wraps to stop air infiltration.

If you are interested in replacing your windows, contact a professional contractor for an estimate. There are some efficient windows out there. Generally, you want to look for a double pane, argon gas filled window with a low emittance (low E) rating.

Windows: Good\_\_ Fair\_\_ Poor\_\_ Action: \_\_\_\_\_

## **5. DOORS**

Doors can also be a large energy waster. Some door materials have a low resistance to heat movement. Foam filled steel doors are very efficient. However, hollow wood doors are not. You want to ensure that you're getting the best performance out of what you have. Your goal here is to reduce air infiltration.

Make sure the door seals well. If the door is loose or warped so that you can see daylight around it when it is closed, install some weather stripping to tighten it up.

Make sure the threshold seals the bottom of the door. Again, if you can see daylight under the door when it is closed, replace the threshold.

If you have a storm door, use it during heating and cooling season.

If you notice cracks between the wall and window molding, apply caulk to plug this leak.



If you are interested in replacing your doors, contact a professional contractor for an estimate. There are some efficient doors out there. Generally, you want to look for solid core door, or one that has insulation inside. Steel doors with magnetic closing strip are a good choice.

Doors: Good\_\_ Fair\_\_ Poor\_\_ Action: \_\_\_\_\_

## **6. FIREPLACE**

A fireplace provides a large opening for heat to transfer in and out of a home. A fireplace can range from -10% to 10% efficient. They can lose more heat than they produce by taking more heat out of a home via the chimney than they provide. Your goal here is to stop air infiltration.

Make sure the flue damper closes and seals tightly.

Keep the damper closed when not using the fireplace.

Turn your house thermostat down while using your fireplace to save on furnace energy. If you have a wood-burning fireplace, you may consider installing a sealed gas-burning fireplace. These systems are much more efficient. Contact a professional installer for more information.

Install a tight sealing set of glass doors to stop air movement.



If you don't use a fireplace, consider adding board insulation to reduce heat loss or gain. Make sure the insulation is removed before any fire is built.

Remember that when a fireplace is in use, even though you may feel warm while near it your furnace can be running more to replace the heat that is being drawn up and out of the home.

Fireplace? Y\_\_ N\_\_ Action: \_\_\_\_\_

## **7. THERMOSTAT SETTING**

Where you set your thermostat setting is a comfort issue. Some of us know that we can save money if we set our thermostat lower in the winter and higher in the summer. Some are willing to pay the higher prices to remain comfortable. Our goal here is to remember there may be other lower cost ways to keep warm or cool.

Turn your thermostat down 5 – 10 degrees in winter when you go to bed at night and use an extra blanket if you need one. Your furnace will have to catch up in the morning, but you will save more than the catch up will cost.

Turn your thermostat down 5 – 10 degrees in winter when you are not at home. Your furnace will have to catch up when you get home, but you will save more than the catch up will cost.

While home and before going to bed, turn your thermostat down 5 degrees and dress warmer, or use a blanket or comforter.

Consider installing a programmable thermostat that will make changes in temperature settings automatically. Contact a heating and air conditioning professional for more information.



Turn your thermostat up 5 – 10 degrees in summer when you are not at home. Your air conditioner

will have to catch up when you get home, but you will save more than the catch up will cost. Turn your thermostat up 5 – 10 degrees in summer when you are home and use fans to remain cool. Fans use much less energy than your air conditioner.

Try running your air conditioner in the morning for a short time (20 minutes) to clear the home of humidity. This may cause you to run your air conditioner less during the day.

Thermostat setting: \_\_\_\_ degrees    Action: \_\_\_\_\_

### **8. WATER HEATER & WATER TEMPERATURE**

A water heater heats and holds water. As heat moves out of the tank, the water is heated to match the thermostat setting. Your goal here is to keep as much heat in the tank as possible.



Newer water heaters have adequate insulation built into them. Older water heaters may benefit from the installation of a water heater insulation jacket. You may also save by installing insulation on the first 6 feet of hot water pipe. These products may be purchased at a hardware or lumber store.

Water temperature is another comfort issue. We may know that we can save money if we turn our water heater temperature down, but we want hot water. You can check your water temperature with a candy thermometer.

Reduce your water heater temperature.

Install a water heater insulation jacket.



Install 6 feet of hot water pipe insulation.

Water heater insulation? Y\_\_ N\_\_    Action: \_\_\_\_\_

Water heater temperature setting: \_\_\_\_ degrees    Action: \_\_\_\_\_

## **9. RIM JOIST INSULATION**

In homes with basements, the rim joist area can be an energy waster. The wood rim joint has a low resistance to heat movement, and your home can lose energy here. We are talking about the rectangle area between the parallel running floor support boards at the top of the outer basement walls. The goal here is to insulate to reduce this heat movement.



Cut fiberglass roll insulation into small pieces and place them into the rim joist spaces between the floor supports at the top of the outer basement walls.

Rim joist insulation: Y\_\_ N\_\_ Action: \_\_\_\_\_

## **10. FURNACE FILTERS**

A clean furnace filter helps your furnace and air conditioner run more efficiently. A dirty filter makes your system work harder to move warm and cool air around your home.

Replace dirty furnace filters with clean ones on a regular basis. Every 2-3 months may be appropriate unless the weather is very hot or very cold. Then every month may be necessary. This should be done year round.



Check furnace filter? Y\_\_ N\_\_ Action: \_\_\_\_\_

## **11. CRAWL SPACE / FLOORS**

If your home does not have a basement, it may have a crawl space under the floors. The floor is not a good insulator. Warm air will move in and out of the room through the floor into the unconditioned space below. There are two goals here, stop any air infiltration through the floor and corners, and raise the resistance to heat movement with insulation.

If your home has living space above a garage, or a portion of the home is extended over mid-air, the floors here will lose energy if they are not insulated and the holes plugged.

The first question to ask is, “Do you know if you have a crawl space, or unconditioned space below a floor?” If you do, ask the next question “Is the floor insulated?” If you have floor insulation, and it is at least 6” deep, there is nothing to do here. Move on to the next item.

If you have a crawl space or a floor over an unconditioned space and do not have floor insulation, and you are interested in adding some, contact a professional insulation installer (you can find them in the Yellow Pages under insulation), for an estimate.

- Because the insulation must be attached to the underside of the floor, fiberglass roll insulation is usually used.

If you don’t know if you have a floor over an unconditioned space or if it’s insulated, try to find your access door and check. The access door may be on the outside of the home. If you don’t know where your access door is located, or don’t have one, contact an insulation professional to check for you.

Remember to insulate and weather-strip your access door.

Floor insulation? Y\_\_ N\_\_ Action: \_\_\_\_\_

## **12. DUCTS IN UNCONDITIONED SPACES**

If your home has furnace or air conditioner ducting that runs through unconditioned spaces (areas not heated or cooled), you may be reducing the efficiency of your system. Ductwork does not resist heat movement well.

Warm or cool air is created by your furnace or air conditioner and then blown to parts of your home. If the ducts that carry this conditioned air moves through an unconditioned space, it can lose or gain heat (depending on the season). Your furnace or air conditioner must work harder to satisfy your thermostat. Special duct insulation may be purchased at a hardware or lumber store.

Likewise, if the ductwork has cracks or gaps in it, it will lose air. There are two goals here, improve the resistance to heat movement in the ducts, and reduce air movement out of the ductwork. Duct taping the joints and corners of your ductwork can reduce air losses.



Insulate your ductwork that moves through unconditioned space.

Duct tape all cracks and gaps in your ductwork even if not in an unconditioned space.

Ducting in unconditioned space? Y\_\_ N\_\_ Action: \_\_\_\_\_