



## Top Ten Tips for Saving Energy in your Historic Building

*From the Colorado Chautauqua Learning Lab*

The seasons are changing and cooler weather has arrived.

Whether you live in a home built a hundred years ago or ten years ago, there are some basic steps you can take to make your home more comfortable and reduce your energy bills.

The first step in the process is to make an assessment of your home and look for some common problems and areas of concern that are typical in residential buildings. Also, through some basic observation, make a list of the things you notice as you move about and live in your home. For example, where is that slight breeze you feel on the back of your neck when you sit in your favorite living room chair coming from? This inspection process and going through the following checklist is a great start to lowering your utility bills. If you want to take the next step and really get a handle on how you can save some energy, save some money (always a good thing), and keep you and your family more comfortable, consider hiring a professional Home Auditor to conduct a thorough inspection of your home. In many cases, between available rebates, incentives, and savings resulting from the audit (if the suggested remedial work is performed), the cost of the audit will be recouped in a single year. There aren't too many investments out there with that rate of return.

### 1. Air seal your basement and attic.

Most of your heating and cooling dollars are lost due to unwanted air entering and leaving your home. Due to a phenomenon known as the *Stack Effect* (the basis of how a chimney works), outside air is drawn in at the base of the building and exits from the top. Visually inspect your basement or crawl space and attic for large gaps and voids. If you can do this during the daylight hours, you can usually spot these areas by light shining through. Depending on the size of opening, use caulk and foam to seal these areas. Note: stuffing the holes with fiberglass insulation will not stop the air, only slow it down. Fiberglass is not an approved *air barrier*. Adding gaskets to electrical outlets on outside walls can eliminate drafts at that location as well.



*Air seal to reduce air infiltration*



*Air seal foundations with foam*



*Where to air seal your attic*

## 2. Inspect your windows and doors

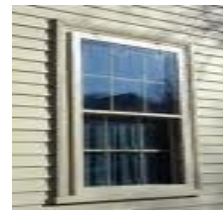
Most windows, even expensive ones, leak. Don't assume that if your windows have been replaced or that the home was built with dual pane windows that they are air tight. Window replacement can be one of the most expensive remodeling jobs done on a home with the longest return on investment. If you have older single pane windows, tune them up and consider installing exterior storms. In many cases, an older primary window equipped with a well fitted storm can be as efficient as a new replacement window at a much lower cost while maintaining the original look of the home. Many municipalities with historic districts will approve the installation of exterior storm windows.



*Inspect and seal around windows*



*Weather-strip doors*



*Historic window fitted with traditional wood storm window*

Unless the weather stripping on your exterior doors is intact and not worn out, doors can be one of the main sources of air infiltration in a home. There are expensive “smoke pencils” available to help detect these leaks but a candle or incense stick will work just as well. Move the candle around the perimeter of the door or window and notice where the flame moves. Caulk, foam or weather strip these areas as needed to stop or reduce the air flow.

## 3. Add more insulation to your home

There are several different types of insulation and each has its own distinct properties and varying R-values. (R-values refer to the specific materials resistance to heat transfer.) As a rule, the higher the R value, the better. When installed correctly, each can improve comfort and lower energy bills. Typically, the easiest and most cost effective place to add insulation is in the attic. Aim to increase your home's insulation to these levels (higher R-values mean more insulating power)\*:

- R-38 for the Attic
- R-18 for the Exterior Wall Frame\*\*
- R-10 to R-13 for the Basement Wall/Crawl Space

\* If you're going to upgrade the insulation, don't neglect the air sealing. No insulation material other than closed cell foam is recognized as an air stopping material.

\*\* Although upgrading the wall insulation is beneficial, this can sometimes be very difficult to accomplish unless you hire a professional or are doing a more in depth remodeling project. Studies show there is more “bang for the buck” with basements and attics, so start there.



*Blown attic insulation will out perform bat insulation*



*Closed cell foam adhered to foundation wall*



*Dense pack wall insulation if needed*

#### 4. Seal your air ducts

Research has shown that as much as fifty percent of the conditioned (heated or cooled) air flowing through a duct system can leak before reaching its intended destination. This results in areas of your home that are either too cold or too hot, depending on the season. This leakage can also lead to problems with indoor air quality and moisture related issues. If you're home is equipped with a forced air heating/cooling system, be sure to carefully seal all accessible duct work. Good old fashioned duct tape is not recommended for this. The tape tends to dry out and eventually develop leaks or fall off the ducts. Use a good quality acrylic duct sealer or mastic to seal all joints and fittings in the duct system that you can access. You may want to hire a professional to conduct a duct leakage test which will identify the level of leakage your system is experiencing. There is also a process available to seal the ducts from the inside if the offending ducts are inaccessible.



*Seal all duct joints*



*Use a good acrylic mastic*



*Examples of common duct leaks*

#### 5. Evaluate your Heating and Cooling Equipment

If your HVAC equipment is more than 10 years old or not keeping your house comfortable, consider replacing it with a new, higher efficiency model. Sized and installed correctly, ENERGY STAR qualified heating and cooling units can save up to 20 percent on heating and cooling costs. Through programs available through your local utility company and state and federal incentives and rebates, you may be eligible for a portion of the out of pocket cost of this upgrade to be reduced. If equipment replacement is not required or feasible at this time be sure to conduct a yearly tune up of your mechanical equipment. For forced air units, be sure to change your filter regularly and inspect the unit for dust build up. A dirty filter can increase energy costs and damage your equipment, leading to early failure.



*Annual furnace inspection*



*A neglected furnace*



*A dirty filter will decrease the efficiency of the system and add to indoor air problems*

Many older homes are equipped with hot water or steam boilers and radiators. Radiant heat can be extremely efficient as it tends to warm the objects in the room (including you) instead of the air in the room like a forced air system (convective heating). Verify the efficiency of your existing boiler and if it's time to replace there are many new, high efficiency models available.

See the checklist and diagram below for more information:

- CHECK BOILER FOR CARBON MONOXIDE
- CHECK THERMOSTAT CALIBRATION
- CLEAN BOILER IGNITION ASSEMBLY
- TEST BOILER STARTING CAPABILITIES
- CHANGE BOILER WATER SIGHT GLASS\*
- MONITOR BOILER FLUE DRAFT
- CHECK BOILER FLUE PIPE (FOR LEAKS)
- VACUUM OUT CHIMMNEY BASE
- VACUUM OUT MAIN BURNERS
- TEST ALL BOILER SAFETY CONTROLS
- TIGHTEN BOILER ELECTRICAL CONNECTIONS
- CHECK BOILER GAS PRESSURE
- CHECK BOILER BURNER FLAMES OUTPUT
- CHECK BOILER PILOT LIGHT FLAME
- CHECK BOILER THERMO COUPLING
- LUBRICATE ALL MOVING PARTS
- CHECK BOILER LOW WATER CUT OFF\*
- CHECK BOILER PRESSURE CONTROL
- CHECK BOILER WATER FEEDER\*
- CHECK BOILER RETURN LINE (IN SITE ONLY)
- CHECK BOILER SECTIONS (IN SITE ONLY)
- CHECK BOILER SWITCH RELAYS
- CHECK BOILER TRANSFORMERS
- CHECK BOILER DRAIN OUT VALVES
- CHECK BOILER CARBON MONOXIDE SPILL SWITCH
- CHECK END OF THE LINE AIR VALVE\*
- CHECK BLEEDER VALVES\*\*
- CHECK BOILER SAFETY ROLL OF SWITCH

- CHECK BOILER CIRCULATOR PUMP\*\*
- CHECK BOILER WATER FLOW VALVE\*\*
- CHECK BOILER CIRCULATOR PUMP FLANGES\*\*
- CHECK CHIMNEY BASE CONNECTION
- CHECK BOILER BACK FLOW PERVENTOR
- CHECK BOILER EMERGENCY SWITCH
- CHECK BOILER AQUASTAT
- CHECK BOILER FLU DAMPER
- WATER LEVEL SIGHT GLASS/VALVES\*
- CHECK AIR LEVEL IN BOILER ROOM
- EMERGENCY VALVES TAGS ON WATER, GAS AND DRAIN SHUT OFF VALVES



*Old boilers commonly found in older homes*

*High efficiency boilers*

## 6. Efficient Water Heating

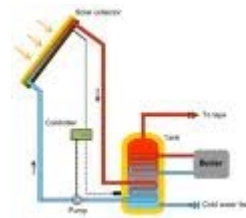
Water heating can account for 15-25% of a home's energy use. Water heater efficiency is measured as an Energy Factor (EF) – higher Energy Factors means higher efficiency. When replacing your water heater, look for models with at least .62 EF. Also consider the option of *Solar Assisted and tankless water heaters*. You may notice how much warmer it is in your mechanical room or in the vicinity of the water heater. This is because the water heater is acting as a large radiator, transferring the heat energy in the stored hot water to the surrounding air. If your water heater is working and does not warrant replacement, consider installing a “water heater blanket”. This is essentially wrapping your tank style water heater with an insulating material to help reduce the heat loss thereby keeping the stored water warmer and requiring the gas burner to fire less often. Also check the delivery temperature of your hot water. Water heaters have a built in thermostat which allows you to adjust the temperature. If you can back the dial down a bit and still have a comfortable shower, you'll reduce the fuel consumption of the water heater. While you're at it, take that extra step and insulate as many of your hot water lines as are accessible. This will also take a bite out of your hot water heating costs.



*Tank water heater with insulation “jacket”*



*Tankless Water heater*



*Solar-assisted water heater*

## 7. Efficient Lighting

Upgraded lighting provides bright, warm light, and can use at least 75% less energy than standard lighting, generates 75% less heat, and lasts up to 10 times longer. To save the most energy and money, replace your highest used fixtures or the light bulbs in them with energy-efficient models. The five highest use fixtures in a home are typically the kitchen ceiling light, the living room table and floor lamps, bathroom vanity, and outdoor porch or post lamp. While LCD (light emitting diode) lighting continues to improve in quality, selection and pricing, CFL (compact fluorescent Lighting) is still a vast improvement in reducing the energy consumed to light your home. Look for the EnergyStar rating on the bulb package as all CFLs are not created equal. Dimming CFLs has been a problem in the past but is also improving.



*CFLs are available in an assortment of styles*



*LCD lights continue to improve and save more energy than CFLs*

## 8. Install a Programmable Thermostat

Through proper use of pre-programmed settings, a programmable thermostat can save about \$180 every year in energy costs. These thermostats automatically set back the temperature when you are away from home or asleep. Keep in mind not to greatly vary the temperature settings. Wide swings in temperature variances can actually result in higher energy consumption with equipment working harder to reach those extreme higher or lower settings depending on the season.



*Programmable thermostats are available in a wide variety of styles and features, including humidity controls*

## 9. Clean the Gutters

Nothing is more detrimental to the well being of your home than the intrusion of water. There are many parts of a well designed “water management system” including maintained roofs and walls, managed ventilation, and control of bulk water in the form of rain and snow. The gutter and downspout system is a key component to the overall design of the water management plan. Gutters that are full of leaves and debris provide no place for this bulk water to go and can cause water to back up under the shingles and contribute to problems associated with *ice damming*. In areas prone to wild fires, the dry debris in gutters provides a perfect ignition source for the spread of traveling frames



*Gutters left unattended add to both roof and wall problems*



*Overflowing gutters dump water directly near your house foundation*



*Dry debris provides fuel for spread of wild fires*

## 10. Prevent Plumbing Freeze Ups

Be sure to disconnect all garden hoses from outdoor spigots. Turn off and drain irrigation systems and evaporative coolers. Identify any pipes that may be exposed to freezing temperatures especially in un-insulated crawlspaces, attics, and north facing walls. Install pipe insulation as needed and in extreme cases “heat tape.”



*Garden hose left connected can cause inside leaks*



*Frozen pipes are costly to repair and cause damage*



*In extreme cases, heat tape can keep pipes from freezing*

For more information related to these topics and other energy savings tips see the following websites:

[www.energystar.gov/index.cfm?fuseaction=home\\_energy\\_advisor.showRecommendations](http://www.energystar.gov/index.cfm?fuseaction=home_energy_advisor.showRecommendations)

[www.greenbuildingadvisor.com](http://www.greenbuildingadvisor.com)