



HIRING BUILDING PROFESSIONALS

Higher cost items are usually more complicated and require the aid of building professionals:

- Curing convective and conductive problems in historic buildings usually requires air sealing a wide variety of leakage areas—including ductwork—and insulating areas that may never have been insulated before. Many buildings in Boulder's historic district have heating season costs of close to \$2000 per year, \$600 of which are due to air leaks alone. Curing them can not only save a great deal of energy, but also raise comfort and extend the lifetime of the building.
- Replacing old boilers or furnaces with modern condensing units may save a lot. Condensing units are much more efficient and do not use the main chimney—which may allow for closing this large hole in the envelope.
- Replacing inefficient appliances can save lots of energy with favorable return on investment (tax free!) Replacing refrigerators with ENERGY STAR® rated units can sometimes save over \$100 per year. New washers can save both energy and water—how much depends on patterns of use and the characteristics of the old versus new unit.
- Although conventional wisdom holds that windows should be the primary target for energy efficiency retrofits, the auditor usually finds a number other energy systems that are more important (and cost effective) to deal with first. Of course, sometimes windows should be replaced, others repaired, and aesthetically appropriate storm windows should added.



REVIEW PROCESS & INCENTIVES

Steps to make historically designated buildings more energy efficient that require exterior changes (including windows and doors) require a Landmark Alteration Certificate (LAC). If you are unsure if your property is designated or want to learn more about the LAC process, please contact the City's historic preservation planning program at www.bouldercolorado.gov or 303-441-1880.

Interior work only does not require a LAC, but extensive rehabilitation work may require a building permit that could fall under the City's Green Points Program depending on the extent of the work.

Energy efficiency upgrades to designated historic properties are eligible for 20% State and in some cases 20% Federal tax credits. See information under "Preservation Tax Credits" at the Colorado Historical Society website, www.coloradohistory.org, or contact Joseph Saldibar at 303-866-3741.

Renewable energy system replacement on the exterior of the building will be reviewed during the LAC process. Information on solar thermal and electric system rebates from both government and utility sources is available at www.dsireusa.org.



TO LEARN MORE...

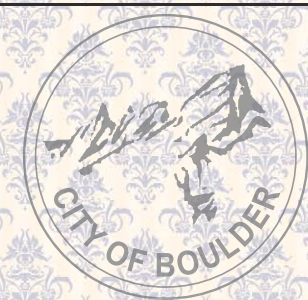
For more information on contractors for rehabilitating historic buildings contact Historic Boulder at www.historicboulder.org or 303-444-5192

This brochure is only an introduction to this important topic. It is supplemented by a supplementary document on making your historic more energy efficient that covers "whys" and "hows" in more detail. This document and others may be downloaded from the Historic Preservation section of the City's web site, www.bouldercolorado.gov



MAKING YOUR HISTORIC BUILDING ENERGY EFFICIENT

The technology for enhancing the energy efficiency of historic buildings is getting better all the time. Acting now will extend their useful lives and reap benefits for both present and future users.





CLIMATE ACTION PLAN & HISTORIC PRESERVATION

Historically landmarked buildings and properties in Boulder's ten historic districts are irreplaceable reminders of the City's past. As energy costs rise and fossil fuel reserves dwindle, improving the energy efficiency of historic buildings is more important than ever.

With the living history of landmarked buildings eloquently addressing where we've been, it is critical to plan for where we are going. In 2002, Boulder's City Council adopted the Kyoto Protocol, and in 2006 adopted a Climate Action Plan to meet Protocol goals of substantially lower emissions of greenhouse gases. It is the city's aim to create compatibility between historic preservation and energy efficiency goals. One such goal is to make a building's environmental footprint gracefully smaller.

Most buildings in our historic districts can benefit from energy efficiency improvements. Well planned and implemented, these improvements can:

- Increase comfort in all seasons
- Make the building healthier and safer
- Save electricity, gas, and water
- Lower energy and water bills
- Potentially qualifying for tax benefits and incentives
- Enhance the building's value

These benefits can be achieved while safeguarding historic authenticity and charm.



ENERGY AUDITS OF HISTORIC BUILDINGS

To find out what energy efficient measures make sense for your building, it is recommended to have an instrumented energy audit done first, then undertake a combination of do-it-yourself work and contracting with appropriate building professionals.



A SYSTEMATIC APPROACH TO A BUILDING'S PERFORMANCE

To analyze options for improving a building's energy performance, an energy auditor views its energy systems and its occupants as interrelated parts of an organic whole. Changes in one part can affect many of the others.

For example, often a combination of air sealing, strategic insulation, and control adjustments will cure the problem of poor heat distribution and lower bills at the same time. Or if a new furnace or cooling system is really needed, a smaller, more efficient unit along with a tighter "thermal envelope" (the insulated shell of the building) and well-sealed ducts may be the best strategy.

The energy auditor uses a number of instruments to evaluate the function, efficiency, and interactions of the energy systems in a building. Watt hour meters monitor refrigerator and freezer performance. Monometers, combustion analyzers, and gas leak detectors help in assessing heating, cooling,

ventilating, and hot water systems for appropriate control settings, efficiency, and safety. A calibrated, variable speed fan is temporarily mounted in a doorway and used to measure the relative tightness of the building and identify most sources of leaks. An infrared sensor helps to find insulation voids.



DID YOU KNOW?

Except when the wind is blowing particularly hard, the dominant force causing convective losses in homes is called "stack effect." The greater the temperature difference between the inside and outside—and the taller the dwelling—the greater the force of stack-effect. The resulting discomfort and energy waste is at a maximum on the coldest day of the year, just when the furnace is working its hardest to maintain comfort. Since infiltration forces are greatest at the bottom of the envelope and exfiltration forces greatest at the top, sealing openings in basements and attic floors is especially important.

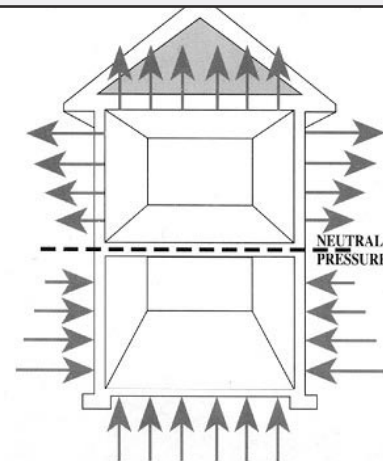


RESULTS

The auditor usually finds a number of opportunities to save energy without spending much money or time. Lower cost items recommended may include:

- Adjusting thermostats that control hot water heaters, refrigerators, freezers, fans, furnaces, boilers, and air conditioners. When appropriate, installing a modern electronic thermostat may be recommended. Settings thermostats back can save lots of energy while ensuring good comfort. Each degree F of continuous set back can produce a 3% savings in Boulder's climate. Eight hour only setbacks can save about 1% per degree F setback.
- Curing water leaks, replacing high flow shower heads with good-quality, low-flow models, insulating water pipes and hot water heater tanks.
- Replacing incandescent lights with compact fluorescents (CFLs). New CFLs fit almost anywhere, produce excellent light, are noiseless, and outlast incandescents by a factor of ten. Over their lifetimes, they pay back their initial costs by a factor of 30.

Many buildings in Boulder's Historic District have recessed fixtures that penetrate the insulation. Thermal and convective losses melt snow, cause premature roof failure, and waste energy. Sealing them and replacing incandescents with CFLs can help!



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Modern electronic thermostats can be programmed to suit your schedule and be different on weekdays and weekends. It is easy to temporarily override them when needed without changing the program. When a home is air sealed and well insulated, it drifts down in temperature quite slowly even on cold nights—yet may be heated quickly the next morning.



The average home in the US has 38 incandescent bulbs. Replacing them with CFLs will save an amount of energy over their 10,000 hour lifetimes equal to that of the gasoline needed to drive a Prius around the equator five times.



For more information on energy audits or building professionals, please contact Historic Boulder at www.historicboulder.org or 303-444-5192

