

Energy Audits and Assessment Tools



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When putting together a plan for reducing energy use, the most important thing is to have good information. An energy audit is the key.

Each building has a unique energy profile and every business has its own energy needs and requirements. In order to make informed decisions about energy efficiency improvements and investments, a property or business owner needs first to understand its current energy use. A professional energy auditor can inspect the property and provide the analysis. However, there are also tools available for the individual who wants to do it themselves or for a Main Street Iowa program to assist property owners in assessing cost-saving opportunities.

What is an “Energy Audit”?

The term “energy audit” refers to an assessment of the current and historic energy use of a building, business or home. Energy audits can include analysis of electricity and natural gas usage, and may include lighting, heating and cooling systems, building envelope and insulation, appliances, refrigeration, signage, windows and doors and even landscaping. The purpose of an energy audit is to assist the building owner or tenant in making well-informed decisions about how to manage their energy budget and make cost-effective energy upgrades.

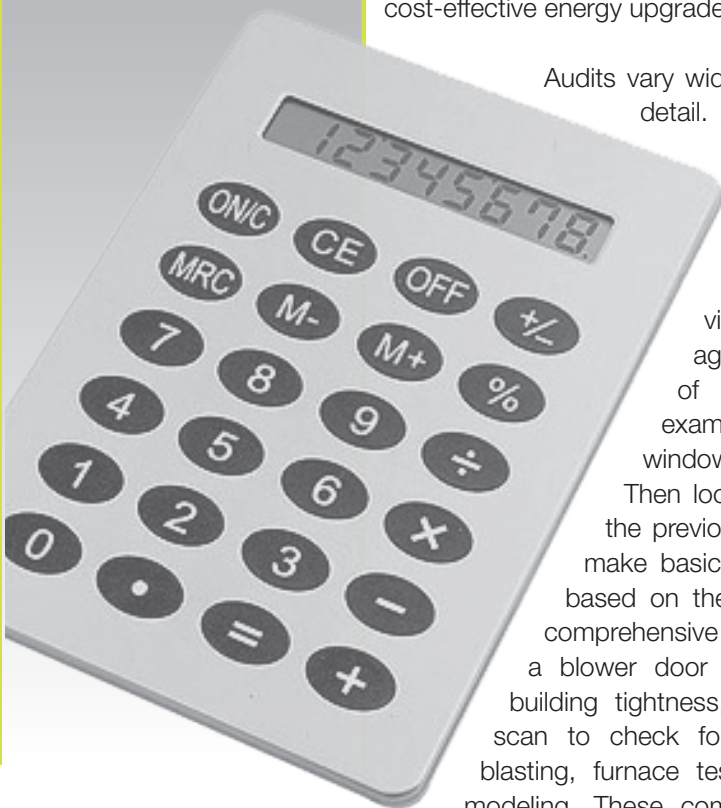
Audits vary widely in their level of detail. A basic “clipboard audit” may include a walk-through of a building to count lighting fixtures and bulbs, visually inspect the age and condition of equipment, and examine insulation, windows and doors.

Then look at utility bills for the previous 12 months and make basic recommendations based on the findings. A more comprehensive audit might include a blower door test to determine building tightness, a thermographic scan to check for heat loss, duct blasting, furnace testing or computer modeling. These comprehensive audits

provide more detail on return on investment and how quickly capital-intensive improvements will pay for themselves in energy savings — often referred to as the “payback.” An individual may be able to perform his or her own clipboard audit using free tools available online, but there is no substitute for a comprehensive audit performed by a professional auditor when looking for significant energy savings.

The local utility provider may provide free or discounted audits and may even provide some basic energy upgrades for free — pre-rinse sprayers, vending machine controllers, LED exit sign retrofits and pipe insulation. If they don’t and only provide a clipboard audit, consider contacting a professional energy auditor to schedule a comprehensive audit if that better suits the business’s needs. This type of “investment grade audit” can help a business make very accurate estimates of return on investment of specific capital improvements. Make sure to ask about what is included in the audit, the cost and ask for references. Professional certifications from organizations like BPI (Building Performance Institute), RESNET (Residential Energy Services Network) or the Association of Energy Engineers are a good indication of a professional auditor’s knowledge, but nothing takes the place of references from satisfied customers.

The auditor should provide the best possible analysis of the building’s energy profile, benchmarking (comparing current consumption to similar facilities) a complete breakdown of the end use, suggestions for improvements and estimated payback of those improvements. For more information on how to choose an energy auditor, visit the US Department of Energy’s website: www.energysavers.gov/.



Online Calculators

In a community where a free audit is not available or if a professional audit is not in the budget of a business or property owner, there are still ways to begin the process of assessing the building's energy use and making an informed plan for improvements. With free web-based calculators or spreadsheets and a few inexpensive tools, an individual can conduct a basic energy assessment of a building.

There are a number of good energy audit tools available on the web. Some are general, some are for specific types of businesses and some targeted at programs in specific regions. A good place to start is the Energy Star small business page: www.energystar.gov/index.cfm?c=small_business.sb_index. Energy Star is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy. Their website features links to a number of useful tools for calculating energy savings by upgrading lighting, refrigeration, appliances, heating and cooling equipment and more.

Using an Energy Checklist

To make a methodical assessment of the current condition of a building, make a checklist. By using a checklist that includes the major areas for energy consumption and waste, an individual can take a baseline measurement, make notes and identify the areas where obvious improvements can be made. For example, when examining a furnace, it may be assumed that since the furnace is only three years old, it is efficient. However, if the filters have not been changed regularly and it has not received seasonal service, it may be wasting a great deal of energy. A good checklist will serve as a reminder to check easily overlooked areas for efficiency improvements and give the user the type of data needed to effectively use calculators, software and modeling tools to estimate the return on investment of various improvements. A checklist customized to the property can be compiled and used for long-term inspection, planning and upgrades.

Assessment Tools

A base level of savings can be acquired with no specialized tools. The "low-hanging fruit" can be picked by simple visual inspection, collecting data and using basic pay-back calculations. However, a few inexpensive tools can add a great deal of specific data to a do-it-yourself audit. These tools can be purchased from a local hardware store, home center or found online. Better yet, they can often be rented. In some communities they can be checked out from a library or borrowed from a local utility provider. A local Main Street Iowa program may consider purchasing one or all of these tools and offering either services or checkout to businesses in the district.

- **Energy Usage Meter:** Several models are available for as little as \$30. These meters allow the user to collect real-time and cumulative data on the amount of electricity consumed by a given appliance. They can assist in making informed decisions about when it is time to replace devices and appliances and help determine payback on investments.
- **Infrared Thermometer or Thermal Leak Detector:** Another useful tool for under \$50, these can help locate areas of heat loss around windows and doors, plumbing and electrical penetrations, ductwork, etc.
- **Illuminance/Light Meter:** In retail display spaces, restaurants, offices and other businesses, proper lighting is essential. Many people are surprised that some areas may be underlit, while others are overlit. Newer, more efficient lighting may provide more light while saving energy, and an illuminance meter can help do an in-depth lighting audit.

Every building has its own unique characteristics, and every business has its own individual energy profile. To make the best decisions about energy efficiency investments, these unique circumstances need to be considered and an energy audit is the best way to do that. Utilizing calculators, checklists and a few basic tools, a property or business owner can make informed decisions and set off on the path to lower energy bills and a greener operation.

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Sample Checklist

This checklist provides a point system based on the level of efficiency gained by various measures and equipment. Checklist items will vary per property type depending on if it is a leased property, if there are any apartments and the historical significance of the property.

	Points
Lighting	
CFL or T8 fluorescent bulbs in all fixtures (not closets, basements, etc.)	(5 pt)
CFL or T8 fluorescent bulbs in 50-99% fixtures (not closets, basements, etc.)	(3 pt)
CFL or T8 fluorescent bulbs in 1-50% fixtures (not closets, basements, etc.)	(1 pt)
Only incandescent bulbs provided	(-2 pts)
Hot Water	
All accessible hot water piping insulated with 1/2 inch foam wrap	(1 pt)
Faucet aerator installed on all bathroom and kitchen sinks.	(2 pt)
90%+ efficient water heater	(2 pts)
Water heater more than 15 years old	(-1 pt)
Heating Cooling and Ventilation	
Working programmable thermostat installed for heating and cooling	(3 pts)
90%+ efficient boiler/furnace	(4 pts)
12.0 SEER(Seasonal Energy Efficiency Rating) central air conditioner or higher	(2 pts)
Certified AC service (clean coils and test) in past year	(1 pt)
Old furnace – more than 10 yrs old (-1 pt) more than 20 yrs	(-2 pts)
Old central AC – more than 10 yrs old (-1 pt) more than 20 yrs old	(-2 pts)
New furnace filters	(1 pt)
Insulation	
Weather-stripping on all doors to the exterior	(2 pt)
Insulation behind wall plates on outlets and wall switches on exterior walls	(1 pt)
Building has windows with:	
Tight storm windows (no broken glass)	(3 pts)
Weather stripping on windows to the exterior	(2 pts)
Double-pane windows (or well-maintained storm windows in historic applications)	(5 pts)
Completely insulated exterior walls	(4 pts)
Attic insulation	(6 pts)
Minimum R-38 insulation	(6 pts)
Living space above business	(5 pts)
Minimum R-21 insulation	(2 pts)
Floor insulation	(3 pts)
Minimum R-12 under all floors with unconditioned space below AND/OR	
Minimum of R-12 insulation around sill plate of enclosed un-finished basement	(3 pts)
Appliances (as applicable for upstairs apartments)	
Energy Star refrigerator	(2 pts)
Refrigerator newer than 8 years	(1 pt)
Refrigerator older than 15 years	(-1 pt)
Extra refrigerator any age	(-2 pts)
Laundry (as applicable for upstairs apartments)	
Front loading washer	(2 pts)
Energy Star top-loading washer	(2 pts)
Clothes dryer with moisture control	(1 pt)
Older or non-Energy Star laundry machine	(-1 pt)
No laundry	(0 pts)
Rating Scale:	
21 points – Low Efficiency	27 points – Average Efficiency
33 points – Above Average Efficiency	38 points – Very Good Efficiency

Resources

U.S. Department of Energy Office Efficiency Checklist

www1.eere.energy.gov/femp/services/energy_aware_oe.html

Alliant Business Energy Audit

www.alliantenergy.com/UtilityServices/ForYourBusiness/ProductsServices/BusinessRewardsIncentives/IowaBusinessIncentivePrograms/015892

MidAmerican BusinessCheck

www.midamericanenergy.com/ee/ia_bus_businesscheck_onsite.aspx

Iowa Association for Energy Efficiency

www.iowaenergy.org/

Iowa Energy Center

www.energy.iastate.edu/Efficiency/index.htm

Iowa Association of Municipal Utilities: Efficiency Overview

www.iamu.org/services/electric/efficiency/default.htm

Iowa Association of Rural Electric Cooperatives

www.iowarec.org/

Iowa Utilities Association

www.iowutility.org/asp/aboutiua.asp

Database of State Incentives for Renewables & Efficiency

www.dsireusa.org/

Black Hills

www.blackhillsenergy.com/services/programs/homes-heateff-ia.php

Atmos Energy

www.atmosenergy.com/home/efficiency/iowa.html

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