

Energy Audits Help Control Rising Energy Costs

What is an Energy Audit?

An energy audit is a term used to describe a broad spectrum of energy studies, ranging from a quick walk-through of a facility to identify major problem areas, to a comprehensive analysis of the implications of alternative energy efficiency measures sufficient to satisfy the financial criteria of sophisticated investors. Check with your local energy provider, as most provide these services to commercial customers and may even reimburse the cost of the audit upon completion of recommended energy savings strategies.

ASHRAE is one of the latest organizations to offer Energy Audit services in conjunction with a program it calls *Building Energy Quotient (bEQ)*. This is a building energy labeling program that lets commercial building owners zero in on opportunities to lower building operating costs and make informed decisions to increase value. It uses in-depth analysis and an intuitive scale to compare a building's energy use with similar buildings. In addition to recommending actions to reduce energy use, bEQ also screens for indoor environmental quality. The good news is that energy efficiency and superior indoor environmental quality are not mutually exclusive, as long as the appropriate air filtration technology is used.

Did You Know?

Building sale prices for energy efficient buildings are as much as 10 percent higher per square foot than conventional buildings.

Source: U.S. Green Building Council



During an Energy Audit (as outlined by ASHRAE), an assessor will:

- Perform a walk-through survey to become familiar with building construction, equipment, operation and maintenance.
- Meet with the owner, operator and occupants to learn of special problems or planned improvements and operation or maintenance issues.
- Complete a space function analysis and determine whether efficiency may be affected by functions that differ from the original functional intent of the building.
- Identify low-cost/no-cost changes to the facility or to operations and maintenance procedures that will result from these changes with their approximate savings.
- Provide a summary of special problems or needs including possible revisions to operations and maintenance procedures.
- Recommend potential capital improvements and provide an estimate of potential costs and savings.

In addition to providing Energy Audit services, ASHRAE also offers *Procedures for Commercial Building Energy Audits*, a reference that defines best practices and guidance for building owners/managers, real estate professionals and other purchasers of energy audit services.

After the Audit: How to Optimize the HVAC System's Energy Efficiency

Informed selection of the proper air filtration technology can help facilities reduce HVAC system energy expenditures. The key is to look at the filter's airflow resistance. The more resistance there is, the more energy is needed to push air through the filter, thus increasing the blower or fan motor's energy consumption.

Airflow resistance is calculated with a pressure gauge, which indicates Water Gauge (WG), the measure of the pressure required to lift a 4 degrees Celsius column of water a certain distance in the air.

For example, a 0.05" water gauge (WG) reduction in a filter's initial pressure drop (also known as airflow resistance) can reduce energy costs by up to 3.5 percent or about \$7 per filter, while a 0.20" WG reduction in a filter's initial pressure drop can reduce energy costs by up to 10 percent or about \$28 per filter. While an energy cost savings of \$28 per year may not sound like a lot, keep in mind that those cost savings are per filter, not for an entire HVAC system.

When selecting air filters for low airflow resistance, consider the advantages of filters made with electro-mechanical air filter media. They almost always deliver lower airflow resistance in the same filter construction and at the same MERV rating as a filter using mechanical-only filtration methods, which tend to create significant drag or resistance because their filtration mechanisms cause disruption of the particles in the air stream. Lower airflow resistance and reduced energy consumption also means electro-mechanical media filters can help reduce greenhouse gas generation – a wise sustainability strategy.

When evaluating HVAC air filters that use electro-mechanical filter media, it's best to look for one with a depth-loading media that has a density gradient structure. This combination can help to reduce airflow resistance, enhance dust loading and prevent face loading of the filter.

Did You Know?

Energy use is the largest operating cost involved in air filtration, accounting for about 80 percent of the annual operating costs of an air filtration system.

It's important to note that even filters with low airflow resistance can cause the HVAC system to consume more energy if the filters are not changed out with the appropriate frequency. Airflow resistance typically increases with filter usage as the filter becomes loaded with contaminants removed from the air. This filtration is essential for air quality and protection of HVAC equipment, but it comes at a high cost when filter change-outs are delayed. In fact, the small amount of money saved by reducing the frequency of filter change-outs pales in comparison to the energy and operating costs that can be saved with a robust air filter maintenance program.

Delaying filter change-outs causes the filter to run more days at peak airflow resistance and energy usage. It doesn't take long for peak energy usage cost to offset any savings in reduced filter purchases, since the cost of energy used to operate the filter can be more than eight times the initial purchase price of the filter itself.

A final word of advice: when selecting air filters that balance energy efficiency with good IAQ, involve other facility management functions in the decision process. In many cases, one department (and budget) may be responsible for purchasing air filters and filter service contracts while another is responsible for energy expenditures. The problem inherent in this system is that the filter purchaser can easily and innocently make a costly decision for the enterprise without considering the energy consumption implications of different filter technologies.

Bottom Line for Facility Managers and HVAC Contractors:

Whether you do it before your Energy Audit or after as part of the Audit recommendations, one important initiative should be to upgrade the HVAC air filtration system so that sub-optimal airflow resistance does not contribute unduly to the overall energy efficiency of the entire system. Learn more about the impact of airflow resistance on energy expenditures [here](#).

Bottom Line for Filter Manufacturers and Distributors:

Help your facility management customers make informed decisions about their HVAC air filtration system by showing side-by-side comparisons of various filters' airflow resistance and demonstrating how differences in airflow resistance can impact energy expenditures. To get started, use this handy [online calculator](#).