

An Energy Audit Of Your Building Will Outline Savings Options

Even in our current economic situation, energy forecasters are confident that electricity demand will, over time, continue to grow. That's just one reason renewable energy sources are such a popular news topic today. As you may have read recently, solar photovoltaic panels and wind turbines are valuable new technologies for generating electricity without adding toxic emissions to the environment.

However, improving energy efficiency offers an even greater energy resource, at a much lower per-kilowatt (kW) cost.

In other words, it's a bargain. In the words of Stephen Chu, the Nobel-prize-winning Secretary of Energy: "Energy efficiency is not just low-hanging fruit; it is fruit that is lying on the ground. And energy efficiency means money back in your pocket because you pay less on your energy bills."



Audits involve measurement!

For owners of existing buildings, improved efficiency also means lower overhead expenses. Resulting savings increase available capital for more productive uses, including funding installation of solar or wind—which could further reduce your energy costs..

- No one can plan to make significant efficiency upgrades without first beginning with an understanding of
- where you currently are using energy inefficiently, and
 - of the products available to improve that performance.

To gather this information, your building must undergo an examination that's commonly called an energy audit. It's a critical first step in any effort to improve a facility's energy-use profile. Ultimately, it can result in major energy savings for your building.

Two important things to remember, right off the bat:

1. Though the word "audit" may conjure up an unfortunate association with a visit from an IRS agent, in this case the process is (at the very least) **friendly!**
2. All audits are based on the old business-school adage that "you can't manage what you don't measure." Or, to frame it more positively: *What's measured also can be managed.*

Energy use can change over time

Energy audits can take a range of forms. At the fast, simple end, an audit can amount to just an inventory of a single building's existing lighting equipment. A more involved process, that could involve a higher level of analysis, would undertake a campus-wide detailing of all energy-using systems and billing charges.

Perhaps, at one time, you (or the building's previous owner) had a clear picture of the structure's energy use...perhaps back when it initially was put into service. However, that image may no longer match reality. Owners and architects often only think about a building's systems as a whole when the structure is first designed and built.

But over time, space is reorganized; systems are retrofitted; and new, more efficient products come onto the marketplace (and may or not be installed).

Taking a fresh, holistic look at in-place equipment and new alternatives is the only way to bring your building back to peak operating performance—and your energy budget back into line.

Fruit-picking auditors

The building envelope—its walls, roof, and windows—presents an obvious target for any auditing project. Investigators want to know where the building might be losing heat in winter (and/or gaining heat in summer).

Some suggested improvements, such as improving caulking around wall openings, may be relatively easy fixes. Other options, such as improving exterior insulation, may lead to larger renovation efforts.

Interesting Reading:

Your Electricity Bill

When studying your building's energy use, it's important to investigate not just how much electricity you're using, certainly. But, also, you'll want to look into the when.

Your utility bills are based on both total consumption throughout the billing period and the maximum electricity used at any one time in that period, so spreading your highest ("peak") demand out could mean significant savings.

Most utilities perform (at least) two measurements on electricity use at non-residential facilities:

Total consumption—measured by a standard electricity meter. The measurement is expressed (and listed, no doubt, on your bill) in kilowatt hours (kWh). Each day, you use more kWh; the total adds throughout the month.

Demand—the utility also records your building's power load for each 15-minute period throughout the day (measured in kilowatts, or kW). This can even be a "rolling" window (in other words, there are 60 "15-minute windows" that start in an hour).

Here's the kicker: The period in which your electrical load is highest—even if you only reach that level for one 15-minute period during the month—is used to establish your "peak" demand, the basis for your demand charge.

Demand charges typically only apply to non-residential accounts. They recognize the need for utilities to maintain peak-period generating plants that may only run for short periods every year. *These charges can have a large impact on your monthly bill.*

Obviously, that's why your electric bill is such interesting reading. You (or an expert) must look at your energy-use patterns as well as your energy-using equipment.

Reducing your peak-time usage—by rescheduling operations, dimming lights, resetting air conditioning or other tactics—can have as much impact on your energy expenses as new-equipment investments.

Combining these two approaches could result in surprisingly large savings!



Electrical Contractors Offer Expertise You Can Trust

While the value of an energy audit can appear obvious, it isn't always quite as clear to whom you should turn to do the job. Rising energy prices, along with government and utility incentive programs, are bringing a range of new energy auditors into the market, not all of whom may be appropriately trained for the job.

Electrical contractors can be a great resource for this service. NECA (sponsor of the Electrical Design Library) is working to ensure they have knowledge needed to maximize your savings.

And NECA, along with its industry partners, continues to help its member contractors maintain their expertise. The education programs cover a broad range of green-energy topics, from automated building operations to solar photovoltaics, so electrical contractors and their workers will have the skills needed to address installation and maintenance as well as energy auditing.

NECA's Management Education Institute (MEI) is training electrical contractors to perform both screening audits and preliminary energy assessment audits using a curriculum developed under a research grant provided by ELECTRI International—the Foundation for Electrical Construction Inc.

Further, NECA and the International Brotherhood of Electrical Workers (IBEW) have developed a *Green Jobs Curriculum* for use in the more than 300 NECA-IBEW training facilities across the country.



Opening up your walls, of course, probably isn't the result for which you are looking. Addressing inefficient electrical systems can provide many opportunities for reducing energy use without major surgery!

Lighting, for example, is seen as "low-hanging fruit" in many efficiency-improvement plans; a lighting audit is a great first step toward cutting electricity use and expenses. An electrical contractor or other energy professional can assess your current fixtures and lamps and recommend new products.

First target will probably be outdated equipment still. Many buildings in our country still use T12 fluorescent lamps (these have been banned from new installations, but more than 100 million were sold into the market in 2008, according to government statistics).

More efficient T5 and T8 fixtures use 20-30% less energy to produce the same amount of light; additionally, today's fluorescent fixtures have solid-state ballasts that may feature dimming capabilities (offering you the chance to use even less electricity).

Plus, because T5 and T8 products create less waste heat, such a replacement plan could lower your cooling costs, too.

Exit signs and other fixtures using incandescent lamps are another easy target. The U.S. Energy Dept.'s Energy Star program says replacing incandescent exit signs with compact-fluorescent units can mean annual savings of \$10 per fixture.

Enhancing your savings

Putting a lighting audit's recommendations into action requires an upfront investment, of course. But you might well find the investment return tops a lot of other options. Energy-smart retrofits can pay for themselves very quickly.

What's more, such retrofits continue to generate savings for as long as your updated building is operational (perhaps increasing its resale value on down the road as well).

To ensure even greater savings, think about pairing these more efficient fixtures with daylight and occupancy sensors that can dim or turn off lights when they're not needed. This action will, obviously, save energy. But it also will prolong the life of individual lamps, meaning you'll replace them (paying for product and maintenance costs) on a less-frequent basis.

In larger or more specialized facilities, energy auditors may broaden their attention to include other heavy electricity-using equipment, including refrigerated cases and air-conditioning units. The auditor may collect equipment nameplate information, along with measuring actual operating performance, to get a better idea of realistic efficiency targets.

More sophisticated audits can incorporate an analysis of your facility's billing history along with other available rate schedules to see if shifting some of your electricity use to a different time of day could lower your overall bills.

If your facility includes server or data-center rooms, these are likely to become prime energy-audit targets. Computer servers—and the cooling systems that keep them from overheating—can be enormous energy consumers.

An auditor trained to understand server-room design and operation may be able to identify alternative rack arrangements and cooling-system designs. You might also get advice on operating strategies that can help such equipment run much more efficiently.

Utilities may actually help you!

It may seem counter-intuitive that electric utilities would encourage their customers to become more efficient (doesn't greater electricity use mean higher revenue for them?). But utilities and their regulators now are beginning to appreciate the role improved efficiency can play in meeting growing energy needs.

In fact, in some regions utilities are beginning to invest in improving the energy efficiency of their customers' facilities instead of building new power plants.

Utility regulators in many states are approving rate plans that encourage utilities to think of energy efficiency as *another energy resource*. This move saves the utilities—and their ratepayers—the enormous cost of a new power plant and eliminates the added emissions those plants would have generated.

As a result, many now offer energy audits to their customers at low or no cost.

Taking advantage of such incentives to improve your operation's energy performance makes especially good sense if you are considering adding photovoltaic panels or wind turbines to your facility. This equipment is expensive, even after rebates and tax credits.

By minimizing your energy demand, you'll also reduce the size needed for the solar or wind system. As a result, your renewable installation will cost less—and, thanks to your more-energy-efficient building—it may end up providing a larger percentage of your overall energy needs.



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