

Resources for making energy audits feasible

Application Note

On the hunt for big bucks

Somewhere right now, there's a technician climbing up onto a facility roof with a thermal imager. Inside, the head of operations and the HVAC guy are calculating the effect of raising or lowering indoor temperatures, just a bit. Someone else is over in the side office with six months of electrical bills, analyzing usage patterns and rate fluctuations.

They're all on a hunt. For ways to operate more efficiently and conserve energy. For operational savings that's hidden in a vent that's stuck open, in inefficient lighting, or maybe in chiller operations that run an extra hour a day more than necessary.

We've all heard the stories. Find annual savings of \$200,000, \$500,000 or more, in the unlikeliest of places. Save 18 percent on energy costs with minimal capital investments. Discover enough immediate savings to pay for the audit and the system upgrades.

We may have also dismissed these stories as fairy tales. Facilities may be thinking: We're too lean. We don't have the budget or the staff. We've already cut everything we can cut. Management will never approve this use of time and money. Contractors may be hearing "not now" from clients already stretched too thin.

Here's the missing ingredient: We know more now than we did even a few years ago, about where to look for unnecessary waste. We also know how to quantify the dollar value of that opportunity. That allows you to

create a more accurate proposal that's more likely to be approved and achieved.

Size for who you are

The big dollars are usually associated with audits at large facilities with lots heavy machinery and little preventive maintenance. The energy audit team collects data ahead of time, spends three to five days inspecting, decides what to change, and then implements fixes, updates, and process improvements. Depending on the facility, the inspections may cover everything from motors and drives to electronic equipment usage patterns to waste management practices.

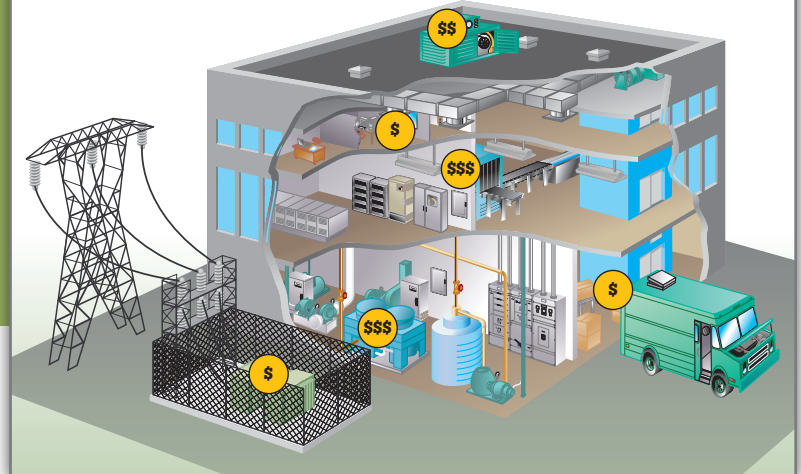
Top places to look for energy waste

Almost all audits find equipment on but not in use, inefficient lighting technologies or usage, and HVAC systems that are not optimized.

\$\$\$ Biggest opportunities: lighting, compressed air, steam systems

\$\$ Medium opportunities: HVAC, motors and drive

\$ Smaller long-term opportunities: building envelope, waste/recycling, IT/electronics



If you can do a comprehensive audit, you should—and not just because the overall dollar amount will be larger and quicker to achieve. By inspecting multiple areas in the same time period, you'll also notice common waste patterns and find ways to leverage improvements across multiple systems.

But some facilities find that three days and a full team of experts and tools is just too much. For them to get started, it might make more sense to tackle one system at a time. This is fine, as long as you circle back to see how changes in one system have affected other areas.

Tools for energy inspection

Along with your trusty multimeter and clamp meter, to get the results you suspect are possible, you will need a few additional tools. Some of these tools, like thermal imagers, can be applied to all areas of your organization, and will yield additional improvements in maintenance efficiency. Others, like power loggers, give you essential usage numbers to plug into your energy calculators.

Tool	Application
Power logger	Load studies, energy consumption testing
Clamp meter or clamp accessory	Branch circuit and individual load evaluation; quick power measurements
Thermal imager	Scan electrical, electro-mechanical, process, HVAC, and other equipment for hotspots indicating inefficient operation; scan buildings for leaks
Logging digital multimeter	Monitor power usage cycles, measure pressure and temperature
Infrared thermometer	Scan motors, insulation, steam pipes, ducts, breakers, connections, and wires
Air meter	Evaluate and adjust ventilation levels, verify HVAC controls

Especially lean companies often find the best value in outsourcing part or all of their energy inspection to a contractor who specializes in energy audits. Then, as improved practices reduce the immediate troubleshooting load, existing staff can retrain on system upgrades and inspection practices.

Contractors can especially add value by knowing all of the local, regional and national tax incentives, providing ROI for system upgrades, mastering the more complex power logging tools, and simply, having enough tools, expertise, and people to get the job done.

Build and pitch your plan

If you're running into opposition getting a complete audit approved, you may need a more convincing proposal. What you may not realize is that much of

the savings can be discovered up front, using a power logger and your computer.

1. Tabulate the kind of equipment in use and log how often it's used.
2. Review utility bills.
3. Plug that data into energy calculators
4. Quantify and monetize the savings opportunity

With reasonably solid numbers and a return-on-investment schedule, management and clients are more likely to approve and support an energy audit.

For calculators and other tools to estimate ROI and build your proposal, see the reference list in this article. There's no need to recreate the wheel! Look at what other companies have done and apply their best practices. Fluke also offers energy audit training, through the Energy Answers program.

Web sites to help build your energy plan

While the Internet is full of great information on energy audits, it can take some time to find it. Here's a head start. Use these top sites to get reports on successful audits, online tools, best practices, technology evaluations, and even financial incentives.

- **EPA Energy STAR, www.energystar.gov**, has calculators, guidelines, checklists, schedules, how-to, and many other tools for designing and implementing energy plans and audits.
- **American Council for an Energy Efficient Economy, www.aceee.org**, convenes conferences and workshops for energy efficiency professionals, conducts technical and policy analyses, and offers advice for program managers.
- **Building Owners and Managers Association, www.boma.org**, offers a sustainable operations webinar series for training on operational cost savings and evaluating green building opportunities.
- **Consortium for Energy Efficiency (CEE), www.cee1.org**, has a database of companies that manufacture CEE and Energy STAR equipment. An energy and efficiency think tank, CEE is a good source for technology reviews.
- **Commercial Building Tax Deduction Coalition, www.efficientbuildings.org**, explains tax deductions for expenses incurred for energy efficient building expenditures made by a building owner.
- **Database of State Incentives for Renewables and Efficiency, www.dsireusa.org**, is a comprehensive source of information on state, local, utility and federal incentives that promote energy efficiency.
- **Department of Energy, www.doe.gov**, is the gateway to thousands of pages of how-to energy audit information.
- **Department of Energy's Energy Efficiency and Renewable Energy Network, www.eere.energy.gov**. Click on "Industry" on the left of the page to see industrial and operations information and research.
- **Tax Incentives Assistance Program, www.energytaxincentives.org**, provides information about federal income tax incentives for energy efficient products and technologies.
- **OpenEco, <https://www.openeco.org>**, has assembled helpful news, resources and calculators.
- **FacilitiesNet, www.facilitiesnet.com/energyefficiency**, is focused squarely on facilities.

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