

ENERGY AUDIT: BEGIN ACHIEVING LONG-TERM SAVINGS

Most companies and organizations have many unexplored ways to lower their energy bills. In fact, your own facility likely has several unrealized areas where you can decrease or otherwise optimize your energy usage for substantial long-term savings. While an energy audit is an ideal way to achieve this, many people don't know how to go about doing one themselves. In our latest White Paper, CAS DataLoggers shows how you can get started using our Energy Audit checklist.

WHAT IS AN ENERGY AUDIT?

The goal of an energy audit is to get accurate energy data that shows you where your facility's energy went over the period; which equipment, circuits, buildings or divisions consumed the energy; and exactly when this usage occurred.

If you're a facilities technician or engineer, you can use a data logger to identify these savings areas. Data logger users can monitor energy usage as part of an energy audit to identify areas for future savings.



START SAVING WITH THIS QUICK CHECKLIST

✓ **What Information Do You Already Have?**

Your first step in any energy audit is to look at your facility's existing energy data, along with any other relevant information that has already been documented. This data usually takes the form of utility bills, invoices and meter readings, which are a good starting point.

✓ **Do You Know What Data You Need to Record?**

To accurately measure Power and Energy, you need to measure Voltage, Current, Power factor and Time—however you don't always need to go to those lengths to perform an energy audit! In fact for the purposes of an energy audit, you often only need to measure Current! You can usually treat voltage as a 'constant' meaning that there's no need to record it.

✓ **Do You Need to Log More Than One Value?**

In some specific cases, you may need to log both current and voltage to get a more detailed view of your energy consumption. For this purpose, many data logger models can record both values. You can also record additional values such as temperature or flow, perhaps with the goal of reducing energy consumption or avoiding costly process delays. As an example, a common data logger application is to monitor boiler or tank temperature and simultaneously send the data to a PID control system for real-time process optimization.

✓ **Do You Have Circuit Diagrams?**

Before you begin logging data, you'll need to know the electrical layout of the system or premises to be audited. Ask an electrician to produce the wiring diagram for the premises.

If you don't have a circuit diagram, you should create one to use in the audit. The diagram should show you the various circuits and connections of your system, and in turn this may help you to determine the best points to monitor data, and where to get access.

✓ **Where Are Your Main Culprits?**

Typical energy-wasters include heavy engines, compressors, ovens, boilers, HVAC systems and more. Heavy equipment is usually a great place to start monitoring, with an eye to reducing their consumption or otherwise limiting unnecessary runtime.

✓ **Do You Have a Device to Record Data?**

During an energy audit, you need to record data over a period of time, and for this you'll need a data logger. Once the recording period is over, users can then analyze the collected data using logger software to identify possible savings areas.

✓ **How Do You Want To Document The Energy Audit?**

It's always a good idea to document the audit process. Your documentation should note where you logged the data and should also include a brief summary containing weather data, production data, and other business-related data over the logging period. All this will help you to correlate the information in future and to spot factors which may have caused anomalies.

WHY SHOULD YOU USE A DATA LOGGER?

Data loggers have several features which make them ideal for performing an energy audit:

- **Data Measurement**--Identify opportunities to save energy
- **Continual Recording** - Identify performance issues with supply and equipment
- **Data Analysis**--Calculate the monetary value of future energy savings
- **Analysis & Graphing Software**--This lets you identify the power consumption over the logging period. You can also produce graphs as proof of savings to management and/or financiers.

These devices can be located throughout a facility and installed directly at the piece of equipment or machinery under monitoring. They can operate 'standalone' (on their own) or can be centralized to transmit energy consumption data to a central data server or workstation PC for analysis.

Our [Accsense Electrocoder](#) samples every channel 16 times per cycle, a cycle being 16ms at 60Hz and 20ms at 50Hz. At the end of each averaging period, 3 quantities are saved for each channel: the True RMS average; the Max, which is the highest cycle value during the period; and the Min, the lowest cycle value. Electrocoder will record all the peaks and troughs which are one cycle or longer, enabling truly detailed metering.



HOW LONG SHOULD YOU RECORD DATA?

In an energy audit there are two main approaches to data collection:

1. Start with the incoming power and record your facility's total usage profile over a given period of time (at least a week). Start working your way down each of the major circuits, getting a view of the profile, averages and peaks on each.
2. If you already know the demand and particularly where/what the big energy consumers are, then instead go straight for those loads.

HOW CAN YOU PROVE THE RESULTS?

Even the most accurate data is meaningless if it's not presented to the right person in a meaningful format. To gain the benefits of an energy audit, it's critical to not only collect recent data, but also to ensure that this data is readily available to management, facility supervisors and/or energy system financiers. Today's software typically has filters and zoom functions allowing you to focus on only the data that you're interested in.

Data logger software typically allows you to define the voltage to plot power and energy, then upload recorded data via USB to a PC for analysis. If you log for a period of about a week, analysis software such as the free Electrosoft software can extrapolate the data and give you estimated power/energy figures for a month, quarter and year. This way, all the collected energy data can be documented, analyzed, and portrayed.

With some software applications, you can also print out an Audit Output graph showing proof of the details of the facility's energy usage and performance so owners and technicians can easily identify savings areas. This is especially useful for HVAC&R verification. Note that it's always wise to check these results against your energy bills to make sure there are no fundamental mistakes.

SUMMARY

To sum up, your facility can probably benefit from an energy audit if it's done methodically and results in accurate data. Make sure that you first confer with your facility's technicians regarding what data to collect and where to collect it. Using data logger analysis software, you can then get the actionable data and graphs that you need to go to management/financiers.

WHERE CAN I LEARN MORE?

ISO 50002:2014 is a new International Standard providing helpful information on energy audits for all types of facilities and organizations. ISO EN50001 offers businesses and organizations an actionable way to save on energy costs, but requires users to record hard data. However, organizations are free to choose their own energy targets and to form an achievable action plan to reach them.

The ISO 50002:2014 standard is published here:

<https://www.iso.org/obp/ui/#iso:std:iso:50002:ed-1:v1:en>

For further information on the [Accsense Electrocoders](#), energy audits, or to find the ideal solution for your application-specific needs, contact a CAS Data Logger Application Specialist at **(800) 956-4437** or www.DataLoggerInc.com.