

Energy Auditing and Energy Management

Md. Mustafizur Rahman

Energy Auditor, Energy Audit Cell,
Office of the Electrical Adviser and Chief Electric Inspector
Power Division, M/o PEMR
Email: mrahman51@gmail.com

Abstract

Energy audits don't save money and energy for companies unless the recommendations are implemented. Audit reports should be designed to encourage implementation, but often they impede it instead. This paper writing industrial energy audit reports and suggests some ways to make the reports more user-friendly. The goal in writing an audit report should not be the report itself; rather, it should be to achieve implementation of the report recommendations and thus achieve increased energy efficiency and energy cost savings for the customer.

Introduction

This paper will address two questions:

- "Why should an energy audit report be user-friendly?"
- "How do you make an audit report user-friendly?"

What is a User-Friendly Audit Report?

People generally think of the term "user-friendly" related to something like a computer program. A program that is user-friendly is one that helps you use it with a minimum of difficulty. The audit reports [1]

to mean a report that communicates its information to the user (reader) with a minimum amount of effort on the reader's part. A reader who is busy will not want to spend his/her valuable time struggling to understand what the report is trying to say. If the report is not clear and easy to follow, the reader is likely to set it down to read later, and "later" may never come!

How Do You Write a User-Friendly Audit Report?

Know your audience

The first thing to keep in mind when you start to write anything is to know who your audience is and tailor your writing to that audience. When writing an industrial audit report, your readers can range from the company president to the head of maintenance. If recommendations affect a number of groups in the company, each group leader may be

given a copy of the report. Thus, you may have persons of varying backgrounds and degrees of education all looking at the report. Not all of them will necessarily have a technical background. The primary decision maker may not be an engineer; the person who implements the recommendations may not have a college degree.

The report may start with an executive summary which briefly describes our recommendations and tabulates our results such as the energy and dollar savings and the simple payback times.

Use a simple, direct writing style

Technical writers often feel compelled to write in a third-person, passive, verbose style. Because energy audit reports are technical in nature, they often reflect this writing style. Instead, you should write your audit report in clear, understandable language. As noted above, your reader may not have a technical background. Even one who does will not be offended if the report is easy to read and understand. Some specific suggestions are:

Simplify your writing by using active voice.

Consider that you are addressing the report to one or more individuals.

Avoid technical jargon that your reader may not understand: Don't use acronyms such as ECO, EMO or EMR without explaining them. (Energy Conservation Opportunity, Energy Management Opportunity, Energy Management Recommendation.)

Present information visually

Often the concepts convey in an audit report are not easy to explain in a limited number of words. Therefore, use drawings to show what you mean. Present energy use data visually with graphs showing the annual energy and demand usage by month. These graphs give a picture of use patterns. Any discrepancies in use show up clearly.

Make calculation sections helpful

The methodology and calculations used to develop specific energy management opportunity recommendations are potentially useful in an audit report. Including the methodology and calculations gives technical personnel the ability to check the accuracy of your assumptions and your work. However, not every reader wants to wade through pages describing the methodology and showing the calculations.

Use commonly understood units

In your report, be sure to use units that your client will understand. Discussing energy savings in terms of BTUs is not meaningful to the average reader. Kilowatt-hours for electricity or therms for natural gas are better units because most energy bills use these units.

Make your recommendations clear

Some writers assume that their readers will understand their recommendation even if it is not explicitly stated. Although the implied recommendation may often be clear, the better practice is to clearly state your recommendation so that your reader knows exactly what to do.

Explain your assumption

A major problem with many reports is a failure to explain the assumptions underlying the calculations. When you show your basic assumptions and calculations, the reader can make adjustments if those facts change.

Be accurate and consistent

The integrity of a report is grounded in its accuracy. This does not just mean correctness of calculations. Clearly, inaccurate calculations will destroy a report's credibility. But other problems can also undermine the value of your report.

Be consistent throughout the report

Use the same terminology so your reader is not confused. Make sure that you use the same values. Don't use two different load factors for the same piece of equipment in different recommendations. This could happen if you calculated the loss of energy due to leaks from a compressor in one recommendation and the energy savings due to replacing the compressor motor with a high efficiency motor in another recommendation.

Proofread your report carefully

Typographical and spelling errors devalue an otherwise good product. With computer spell checkers, there is very little excuse for misspelled words. Your non-technical readers are likely to notice this type of error, and they will wonder if your technical calculations are similarly flawed.

Report Sections***Executive summary***

The audit report should start with an executive summary which basically lists the recommended energy conservation measures and shows the implementation cost and savings amount. This section is intended for the readers who only want to see the bottom line.

Energy management plan

Following the executive summary, provide some information to the decision makers on how to set up an energy management program in their facility.

Energy action plan

In this subsection, describe the steps that a company should consider in order to start implementing your recommendations.

Energy financing options

Include a short discussion of the ways that a company can pay for the recommendations. Cover the traditional use of company capital, loans for small businesses, utility incentive programs, and the shared savings approach of the energy service companies.

Maintenance recommendations

Do not usually make formal maintenance recommendations in the technical supplement because the savings are not often easy to quantify. Provide energy-savings maintenance checklists for desired equipments such as lighting, heating/ventilation/air-conditioning, and boilers.

The technical supplement

The technical supplement is the part of the report which contains the specific information about the facility and the audit recommendations. Make the technical supplement into two main sections: one includes assumptions and general calculations; the other describes the recommendations in detail including the calculations and methodology. If required, include a third section which describes measures that analyzed and have determined are not cost-effective, or that have payback times beyond the client's planning horizon.

Standard calculations and assumptions

Provide the reader with the basis for understanding many calculations and assumptions. If possible, include a short description of the facility; square footage; materials of construction; type and level of insulation; etc.

Audit recommendations

This section contains a discussion of each of the energy management opportunities determined to be cost-effective. Try to make the EMRs user-friendly.

Each EMR starts with a table which summarizes the energy, demand and cost savings, implementation cost and simple payback period. Then write a short narrative section which provides some brief background information about the recommended measure and explains how it should be implemented at this facility. If you are recommending installation of more than one item (lights, motors, air conditioning units, etc.), use a table to break down the savings by unit or by area.

The final section of each EMR is the calculation section. Explain the client about the methodology that you use to arrive at your savings estimates. Provide the equations and show how the calculations are performed so that clients can see what you have done. If they want to change your assumptions, they can. If some of the data that have used is incorrect, they can replace it with the correct data and recalculate the results.

Appendix

Use an appendix for lengthy data tables, wherever required. For example, motor efficiencies table which you use in several of your EMRs. Instead of repeating it in each EMR, put it in the appendix. Also include a table showing the facility's monthly energy use history and a table listing the major energy-using equipment. Similar to the calculation section of the EMRs, the appendix allows us to provide backup information with out cluttering up the main body of the report.

Short Form Audit Report

Many energy auditors use a short form audit report. A short report is essential when the cost of the audit is a factor. Writing a long report can be time-consuming and it increases the cost of an audit.

The short form report is useful when an on-the-spot audit report is required because the auditor can use a lap-top computer to generate it. It is also an excellent format for preliminary audit reports when the company will have to do further analysis before implementing most of the recommendations.

However, some short form audit reports have drawbacks. When a report is ultra-short and only provides the basic numbers, the reader will not have a memory crutch if he returns to the report sometime after the auditor has left. Since some clients do not implement the recommendations immediately, but wait until they gather the necessary capital, an ultra-short form report may lose its value. Therefore, some explanatory text is a critical of a user-friendly short form report. The executive summary described above could serve as a model short form audit report.

Feedback

Customer feedback is as appropriate in energy auditing as in any other endeavor. An easy way to get feedback is to give the customer a questionnaire to evaluate the audit service

and the report. Ask the client to rate each section on a scale of 1-10 with 1 being poor and 10 being excellent.

It is important that the questionnaire be easy to fill out. If it takes much time to read and fill out, the clients won't take time to return it. So send the questionnaire along with the report.

Conclusion

Many audit reports are not user-friendly. Most often, they are either lengthy documents full of explanations, justifications and calculations, or they are very short with little backup information. If a report is so long that it intimidates your readers by its very size, they may set it aside to read when they have more time. If it is so short that needed information is lacking, the readers may not believe the results. Writing a user-friendly audit report is an important step in promoting implementation of audit recommendations.

Reference

- [1] Lynne C. Capehart, Project coordinator; Barney L. Capehart; Director, University of Florida Energy Analysis and Diagnostic Center, Department of Industrial and Systems Engineering, University of Florida, Gainesville, FL 32611
<http://www.ise.ufl.edu/capehart/papers/user-rep.doc>