# Module 11: Reporting for Implementation

**Learning Objectives**

After completing this module, you will be able to
- Prepare complete and effective energy audit reports.

## 11.1 Introduction

Regardless of how thoroughly and carefully you conduct the energy audit, and regardless of how beneficial the proposed EMOs are, nothing will be achieved unless action is taken. The link between the audit and action is the audit report.

Too often, audit reports gather dust on someone's shelf. The goal of the Audit Report should be:
- To provide a clear account of the facts upon which your recommendations are made;
- to interest those who read the report in acting upon those recommendations.

There may be a "sales job" to be done on the audit findings, and the report is your vehicle for making the sale.

There are principles of good technical report writing that should be followed, and some of these are included in the guidelines provided in this section. Nevertheless, the auditor should review as necessary his or her technical writing skills, at least to ensure that the use of language is effective, concise and accurate, and that the style of writing is appropriate for the target audience.

This section provides a template for good audit reports, and some suggestions about how to ensure that they lead to action on the audit recommendations.

## 11.2 Some General Principles for Good Audit Report Writing

### *11.2.1 Know your reader*

There may be several people in your organization who will read your report, including the senior manager on site, the Supervisor of Engineering or Maintenance, and the Plant Shift Supervisor, for example. Their backgrounds and their needs for information may be quite different. Since you only want to write one report, you need to consider these diverse needs as you compose it. You will find it helpful to include an **Executive Summary** that hits the high points—for the senior decision makers—and a **Technical Section** that provides the details—for those who will be involved in executing your recommendations.

### *11.2.2 Use simple, direct language*

Some of your readers may be professional engineers or advanced degree-holders, while others may have hands-on experience as qualified tradespeople. The language you use must be clear, concise and understandable by all readers. What this means is:

- Use an action-oriented style in the active (rather than passive) voice: "We found that the insulation on the steam mains was badly degraded . . ." is better than "It was found that the insulation . . . "

- Avoid technical jargon: we have used the term "energy management measure—EMO" in this Guide; if you use EMO in your report, make sure that you define it the first time it appears. Insofar as possible, err on the side of using commonly understood terms rather than highly technical ones, and spell out terms that you might normally use as acronyms (variable frequency drive rather than VFD).

- Ensure that your report is grammatically correct, and that the language flows in such a way that it is easy and interesting to read; you may find it helpful to have someone whom you regard as a good communicator critically assess your report before it is distributed.

### *11.2.3 Present information graphically*

Any technical report— much less an audit report—tends to be dry. The use of graphics to present information—pie charts and other graphs in place of or in addition to data tables, diagrams and schematics of equipment and layouts, digital photos—make your report and its recommendations far more compelling. Some of the software applications that support this Guide generate graphs and charts that can easily be incorporated into your report. Commonly used word processing software such as MSWord enable anyone to create professional-looking and interesting reports and make use this functionality.

### *11.2.4 Make your recommendations clear*

The "meat" of your report is your recommendations section. You don't want to leave any questions in your readers' minds about exactly what you are recommending; be specific, clear and sufficiently detailed. For example, the recommendation "Decommission one 75 kW compressor" doesn't tell the whole story if what you really mean is "Reduce the compressed air load through a leak detection and repair program; upgrade compressor controls; deliver base load with existing100 kW compressor and peak load with existing 50 kW unit; decommission 75 kW compressor."

### *11.2.5 Explain your assumptions*

Since you inevitably must make assumptions in your calculations, be sure to explain them clearly. For example, if a building is occupied on a one-shift, five-day per week, 50 weeks per year basis, state this information to explain why you are using 2,000 hours per year as the time factor in your energy consumption calculations. If it turns out that the building is going to change to two-shift operation, it will be easier for the reader to adjust your calculations.

### *11.2.6 Be accurate and consistent*

Obviously you want your calculations to be accurate; errors will destroy the credibility of what may otherwise be a good report. In addition:

- Be consistent in the style and terminology that you use throughout the report;
- Be consistent in the units of measure that you use throughout the report (not $m^3$ of gas in one place, GJ in another);
- Proofread and spell check your report to ensure there are no misspelled words (your communicator friend can help with the proofreading after you have spell-checked for two good reasons:
  - the spell check won't identify the wrong word spelled correctly,
  - and errors don't stand out so clearly for the person who wrote them.

### *11.2.7 Present your calculations clearly*

Since some of your readers may be technical, they may want to check the accuracy of your assumptions and calculations. Therefore, you should present your calculation methodology clearly, along with at least one sample of each kind of calculation.

## 11.3 A Template for the Audit Report

### *11.3.1 Executive Summary*

Some readers, especially senior decision-makers, will want to know what the key recommendations and the bottom-line implications are, without wading through the body of the report. The Executive Summary should present:

**Tip**: to make the Executive Summary stand out from the rest of the report, you may want to print it on coloured paper.

- ***Summary information on key audit findings:*** for example, annual consumption and/or energy budget, key performance indicators, etc.;

- ***The recommended EMOs***, with a very brief explanation of each; it may be useful to categorize these as operations and maintenance improvements (O&M), process improvements, building system improvements;

- ***The implementation cost, savings, and payback*** (or other financial criterion used in your organization, such as IRR) associated with each EMO;

- Any ***special information related to implementation*** of EMOs.

### *11.3.2 Technical Section*

This part of the report contains the details of your audit findings, including as sub-sections:

**Audit mandate, scope, and methodology:**
This should include

- a statement of the audit mandate—that is, the goals and objectives of the audit;
- a description of the audit scope in terms of the facilities and processes included in the audit;
- the methods used for information gathering and analysis;
- the key people who were sources of information, etc.

**Facility description and observations**:
This should include:

- general description of the facility or parts of it included in the audit (size, purpose, configuration, etc.)
- observations of the general condition of the facility (from the Walk-through);
- detailed cost and consumption information for electricity and fuels;
- summary demand information;
- summary load inventory data.

**Assumptions and calculations**:
Include the assumptions made—such as operating hours, key tariff features—and complete samples of all calculations.

**Audit recommendations**:
This section includes detailed descriptions of the EMOs, their cost, their impact on energy consumption and savings, and payback analysis. As an option, it may also include **Potential EMOs** that have been considered and found not to be cost-effective.

**Appendix**:
This supplement includes background that is essential for understanding the calculations and recommendations, possibly including:

- data tables,
- reference graphs used in calculations, such as motor efficiency curves,
- electricity and fuel tariffs.

## References

**Writing User-Friendly Energy Audit Reports**, Lynne Capehart and Barney Capehart, Conference Paper, University of Florida, Florida, 1993