

PERFORMANCE AUDITING OF ENERGY MANAGEMENT PROGRAMS

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With the oil crisis of the 1970's, energy management programs became important to both the private and public sectors. But with the decrease of oil prices in the mid 1980's, interest in energy conservation programs has declined. Nevertheless, energy conservation remains an effective way to reduce operating costs without cutting services. This paper describes a review process that can be used by managers and engineers to improve an organization's overall energy management program. This energy management audit, as it is called, is much more than an energy audit; it is an assessment of the organization's entire system of controlling energy costs.

The energy management audit discussed in this paper divides an energy management program into five major areas. Each of these areas is subdivided into basic elements which can then be analyzed and evaluated to see if meets the needs of the organization. The results of the audit provide specific recommendations for improving the organization's energy conservation program cost effectiveness and efficiency.

INTRODUCTION

The energy management audit program discussed in this paper has been applied to agencies with energy costs ranging from several thousand dollars annually to more than \$20 million. The goal of the energy management audit is to evaluate the energy conservation program to see if it optimally meets the needs of the organization and to identify its strengths and weaknesses.

It is not the audit team's responsibility to interpret energy consumption data, perform energy audits, or design an energy management program, but rather to evaluate how the organization performs these tasks. The performance audit should illuminate well-defined steps to improve the efficiency and effectiveness of the entire energy conservation system.

This energy program review was initially developed to evaluate the energy conservation programs of 18 major universities in Texas with combined annual energy costs in excess of \$80 million. It was developed for state agencies by the Texas Governor's Energy Management Center. The performance audit procedures are also well suited for private and commercial sector organizations of any size.

PURPOSE

The purpose of the energy management audit is to provide an objective assessment of an organization's entire energy conservation program. The energy management audit examines the contribution that every individual in an organization can make in reducing energy consumption and utility costs. The management audit should not be confused with the energy audit, which is the formal process of identifying energy conservation opportunities (ECO's).

The objectives of the energy management audit are to:

- Determine the effectiveness and efficiency of the energy management program.
- Identify improvements and modifications if needed.

PROCEDURE

The actual audit is performed with the use of a checklist and questionnaire that cover each element of an energy conservation program. By interviewing key personnel and reviewing pertinent files, the key information about the program elements can be determined.

An excellent description of how to set up personnel interviews and what information to request is found in "A Guide For Evaluating Energy Management", by the Institute of Internal Auditors (1). This book describes specific details of planning, conducting, and reporting the results of an energy management audit. Similar guidelines were developed by the Governor's Energy Management Center (GEMC) to assist the universities in conducting management audits of their energy programs. A copy of these guidelines and the accompanying checklist is found in the GEMC report, "Guidelines for Performing a Professional Energy Management Audit in State Agencies (2)."

MAJOR AREAS OF AUDIT REVIEW

Every energy conservation program is composed of a combination of various elements. Most programs can be evaluated in terms of five categories:

- Organizational Structure
- Energy Consumption & Monitoring
- Energy Audits
- Implementation
- Energy Education

Each of these categories and their major elements are shown in Figure 1.

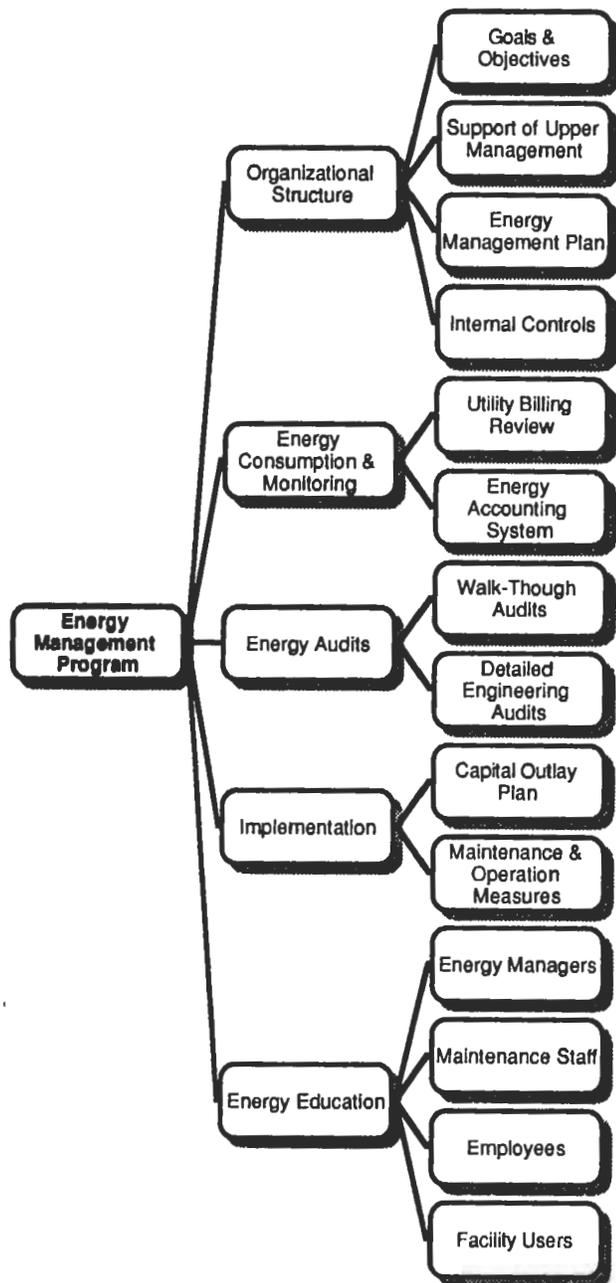


Figure 1

While Figure 1 may not contain all the elements found in every energy conservation program, it includes the major items. The condition of each element listed along the right side can be determined using the checklist and questionnaire referenced in the procedures section.

Organizational Structure. Energy conservation should be more than a single person or department's responsibility. The audit examines the formal involvement of individuals with the energy conservation program. The auditor checks to see if energy management is receiving adequate involvement from upper management. It examines the role of the individuals that are assigned the responsibility of managing energy and how their time is divided among other duties. It looks at the formal lines of communication and the organizational structure to see who is accountable for what.

The management audit reviews the energy management plan to see if the organization has clearly defined goals and objectives. The goals should be designed to meet the needs of the organization and the objectives should be clearly defined, challenging and achievable.

Energy Consumption and Monitoring.

There are many reasons for having an energy metering system. A metering system can be used to monitor the performance of installed energy saving measures, identify abnormal and excessive energy uses, identify billing errors, and establish an energy accounting system. The management audit checks to see if the proper amount of metering and sub-metering is installed and maintained. It is also important to review the internal process used to check utility bills and contracts to ensure the organization is receiving the lowest rate possible and is correctly billed.

Energy Audits. The energy audit is the primary method of identifying energy saving opportunities. The two types of energy audits are the walk-through and detailed engineering audit. The purpose of the walk-through audit is to determine any obvious energy saving measures and to look for other conservation opportunities that may be feasible, but require further engineering analysis. Typically, the latter brings about larger energy savings, but may require larger initial costs. The management audit looks at the energy audit procedures, to see if energy audits are being performed in every area in which the resulting savings would more than cover the cost of performing the energy audit.

Implementation. Once the opportunities are determined, the next step is to implement the measures. This involves reviewing each recommendation, deciding which ones should be installed, and how they will be financed. The management audit evaluates how these decisions are made and by whom. It assesses whether or not the energy audit information is properly communicated to those who need to know it and if the information is acted upon. It checks to see if the proper resources are devoted to energy projects, in comparison to the other needs within the organization. This is done by determining if the energy

audit recommendations with favorable paybacks are being implemented, and if they are not, why not.

Energy Education. An educational program is needed to inform employees and facility users of the role they can play in saving energy and reducing utility costs. The management audit examines the system of professional development established for energy managers, to keep them up to date on current energy saving methods. It also evaluates the educational and incentive programs for employees and facility users.

AUDIT TEAM QUALIFICATIONS

The audit team assigned to perform the audit should collectively possess the proficiency necessary for the task required. The concept of the energy management audit is unique. In general, the audit team should have the following attributes:

- **Knowledge of Management Practices:** In order to evaluate a management system, it is necessary that the members be familiar with management internal control techniques and procedures. This involves having a working knowledge of individual accountability, management by objective, and lines of communication.
- **Expertise in Management or Performance Audits:** The techniques and skills are considerably different from financial audits.
- **Knowledge of Energy Conservation Technologies:** Due to the specialized nature of these audits, the team should be familiar with energy conservation techniques, terminology and systems. It is suggested that at least one of the team members be a knowledgeable energy engineer.
- **Independence From Organizational Management:** The management team should be able to provide an objective and unbiased assessment of the energy management program. To ensure this takes place, the members should be independent of the entity being audited and be free from personal or external impairments that would hinder the achievement of fair conclusions and judgements.

RESULTS

The audit should identify program strengths, deficiencies, and excesses, and it should provide specific recommendations for improving the organization's energy conservation program effectiveness. If there are critical comments, they should be presented in a balanced perspective which takes into account any unusual difficulties or circumstances faced by the operating personnel. The emphasis should not be on

criticism, but rather on constructive suggestions for improvement. It should be written in a clear and concise language, and it should include visual aids, where appropriate, to clarify and summarize complex material (3).

REFERENCES

1. Leathers, Ritts, and Ross, A Guide for Evaluating Energy Management, The Institute of Internal Auditors, 1983.
2. Verdict, M., White, J., Guidelines for Performing a Professional Energy Management Audit in State Agencies, State of Texas, Governor's Energy Management Center, 1987.
3. Standards for Audit of Government Organizations, Programs, Activities, and Functions, Comptroller of the United State, 1981 Revision.