



Energy Auditing – Step by Step

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Energy Auditing

- Why is it Important Today?
- What is It?
- Who Should Auditing Include
- What Should It Include?
- Why Use an Outside Contractor?

Why is it Important Today?

- Rapidly Rising Energy Costs
- Oil and Gas Prices Have Moved into Higher Trading Ranges
- Electric Prices are Projected to Increase 20-30% Over the Next Few Years
 - As the New Higher Fuel Prices Work into Generation
 - As the Industry Begins to Catch Up on Deferred Infrastructure Investment
 - Transmission
 - Generation

Why is it Important to You?

- Energy May only be a Small Percentage of Your Operating Cost
 - Percentages Can be Deceiving
- What is the Absolute Value of Your Energy Bill
 - Both Electric and Fuel (Gas/Oil/etc.)
- How Many of Your Other Operating Costs are Reducible?
 - Labor, Materials, Amortization
 - Most Firms Find These Difficult to Reduce

Objective:

- Produce a Realistic Set of Cost Saving Opportunities that:
 - Fit the Facilities Operation
 - Realistically Conform to Corporate Capital Budgets
 - Avoid Expending Manpower on Analysis of Projects that Don't Conform to the Facilities Needs

Who is Involved

- Auditor
 - Company or Group with Experience in:
 - The Energy Auditing Process
 - For Industrial Audits - Experience with Your Industry
 - Assets to Deal with Energy Contracting

- Owner
 - Involved
 - Willing to Target a Contact Who is Given the Time to Coordinate with the Auditor
 - Willingness to Hold Reviews with More Senior Decision Makers

What are the Steps in an Audit

- Phase 1: Initial Walk Thru and Data Gathering
 - *Output: List of Candidate Options Winnowed Down in a Review Meeting with Management*
- Phase 2: Economic Evaluations of Chosen Options
 - *Output: Review of Economic Acceptability to the Owner*
- Phase 3: Engineering Cost Estimate – May Include Bid/Spec Development
 - *Output: Projects Formally Ready for Finance Discussions and Bidding*

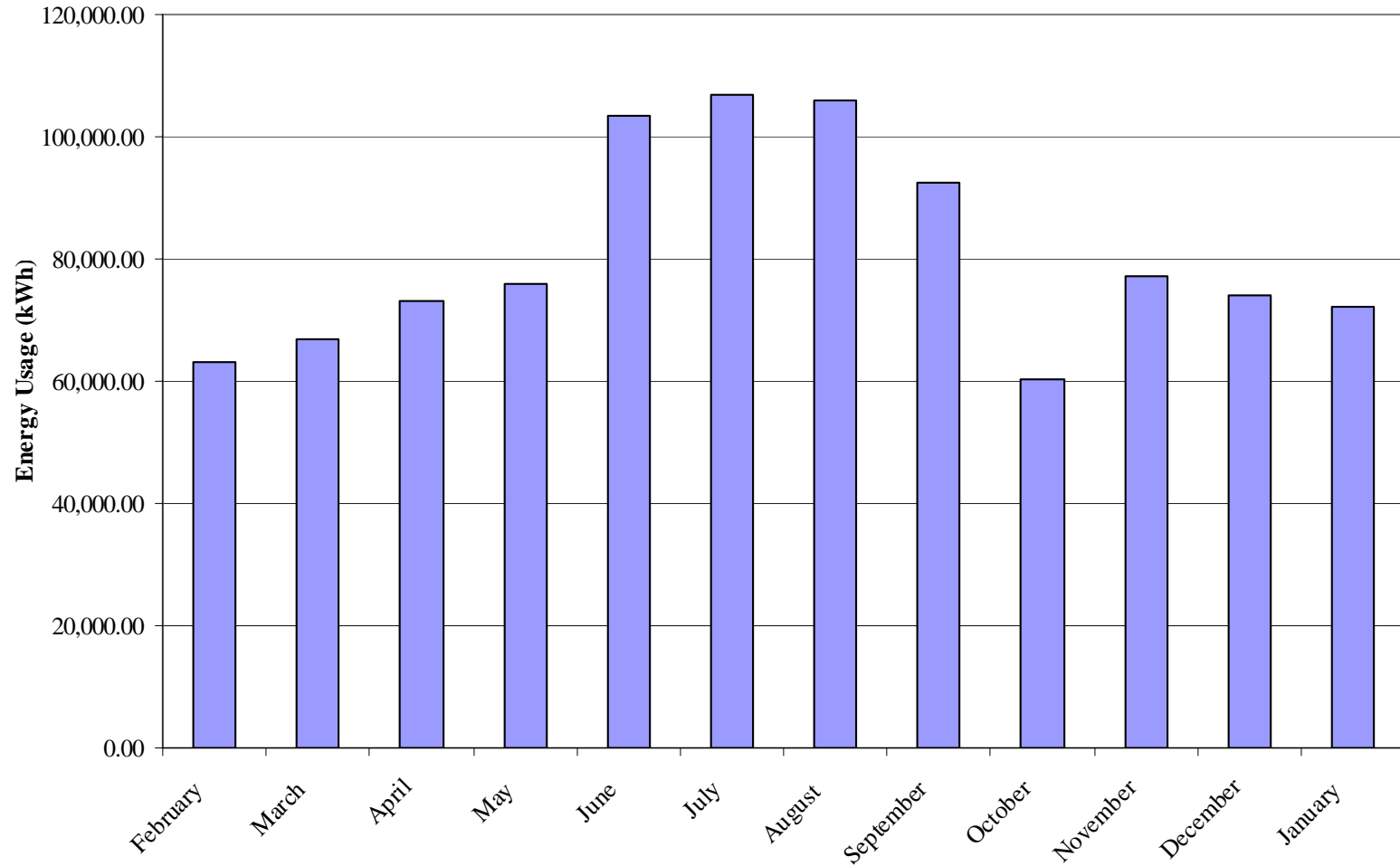
Why Three Steps

- Owner Avoids Extensive Expenditures on Options that are Not Practical for Their Business and Set Focus on those that are Practical

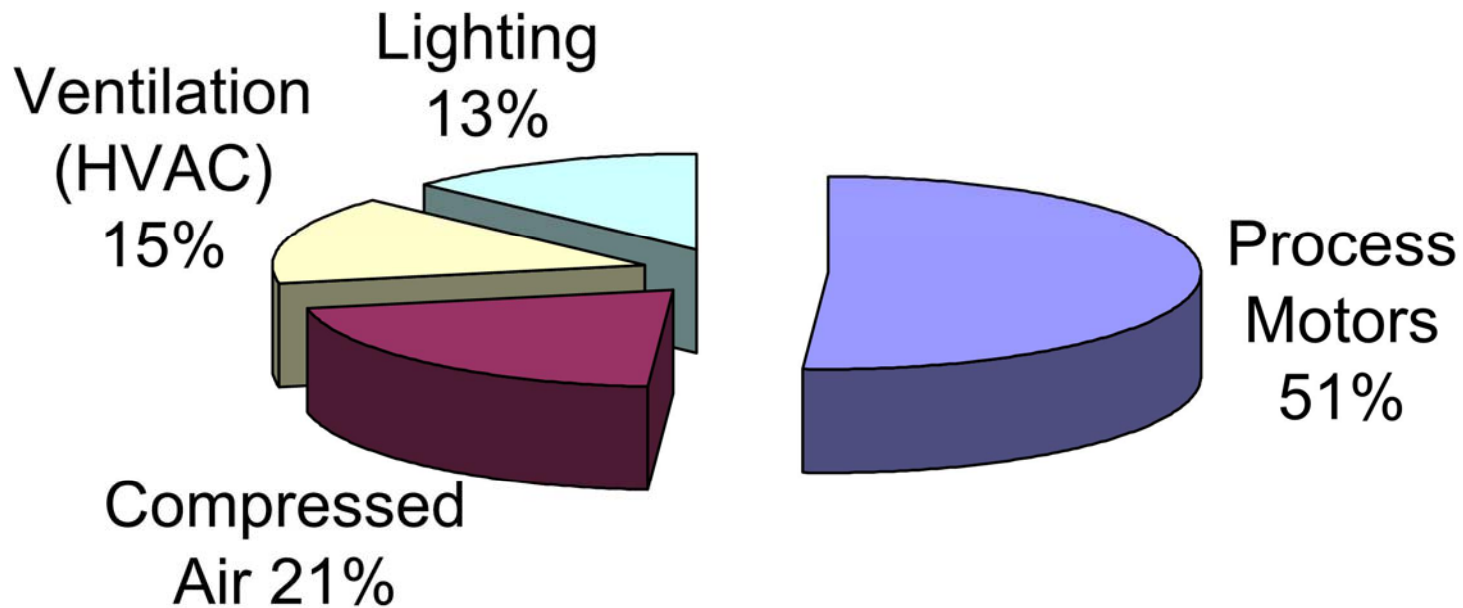
What Should be Done in an Audit?

- Phase 1: Initial Review
 - Walk Thru with the Auditor
 - Discussions with Staff
 - Facility Operation and Schedules
 - Realistic Statement of Financial Hurdle Rates
 - Obtain Utility Bills – At Least 12 Months
 - Auditor Produces Estimate of Energy Uses by Function and Initial Suggestions
 - Initial Review Should be Low Cost – 1-2 Week Effort for Commercial or Smaller Industrial Operation

Usage Profile



Sample Electric Load Profiles for an Industrial Use



Sample Industrial Electric Usage

What Should be Done in an Audit

- Phase 1 Results
 - Meeting Between Auditor and Internal Operating Staff
 - Review Improvement Suggestions
 - Cover Operating Staff Concerns
 - In Industrial – Concerns Tend to Center on Production Quality
 - Meeting Should End with a List of Energy Projects for Further Analysis

What Should be Done in an Audit

- Phase 2
 - Auditor Develops Economic Analysis on Specific Projects
 - May Need to Return to the Plant to Take More Detailed Measurements
 - Examples: Flue Gas Measurements on Existing Boilers, Consumption Metering on Chillers, etc.
- Final Results: Listing Showing Approximate First Costs, Savings, and a Rate of Return for Each Proposed Project
 - Not a Detailed First Cost Estimate

Project List – Forced Ranked by ROI

ROR	Project	Investment	Total Investment
38%	Fix Steam Traps	\$50,000	\$50,000
36%	Insulate Steam Lines	\$75,000	\$125,000
35%	New Lighting	\$150,000	\$275,000
21%	New Boiler	\$1,000,000	\$1,275,000
31%	Insulate Roof	\$600,000	\$1,875,000
26%	New Windows	\$800,000	\$2,675,000
19%	New Chiller	\$2,000,000	\$4,675,000

- Summarized for Management Review
 - This List Shows Projects Force Ranked by ROI and Totaled to Note Cumulative Capital Outlay

What Should be Done in an Audit

- Phase 2 Ends with Selection by Your Management of the Most Practical Projects
 - Selection Must Respect Corporate Capital Budgets
- Phase 3 (Usually for Larger Projects)
 - Detailed Engineering First Cost Estimate
 - System Layout Diagrams (if Needed)
 - May Include Engineering Plans and Bid/Spec Development

What the Owner Can Expect

- An Early (End of Phase 1) Indication of the Potential Value of the Audit Before the More Expensive Phase 2 Begins
- An Auditor Gearing the Proposed Projects to Conform to the Owners Capital Constraints

Energy Contracting

- Auditor Should Have the Capability to Review the Owners Current Energy Supplier
- Understand the Market Well Enough to See the Need for Contract Improvement
- Be an “Honest Broker” Between Potential Contracts
 - Understand Open Bidding Process

Why Use an Outside Contractor?

- Auditing Requires a Short Period of Intense Effort and Experience in the Process
- Generally – Owners Staff are Already Fully Occupied

Internal Energy Management

- Maintaining the Energy Systems Can Make 10-20% Difference in Overall Consumption
- Any Operation with Over \$1,000,000 in Annual Energy Costs Should Consider Devoting a Technician or Engineer Strictly to the Function of Energy Manager
 - Full Time Job, NOT an ADDED Task

Summary

- A Well Planned Audit Can:
 - Produce the Results Targeted to the Owner
 - Minimize the Cost of the Effort
- Owner/Decision Makers Must Be Available to Review Results at Specific Stages in the Process