

Delivering Cost Savings and Sustainable Solutions through Energy Management

Eaton energy solution energy audits



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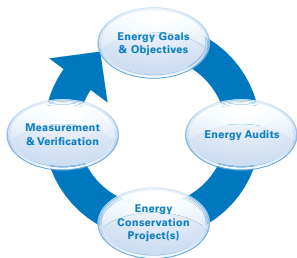
Whether driven by the economy, business conditions, corporate policies or regulatory requirements, such as EPCRA, EISA or an executive order...

Energy audits play a critical role in:

1. Reducing operating cost
2. Preparing for cap and trade
3. Reducing energy consumption

Additionally, energy audits are required on an ongoing basis to drive energy management and continuous improvement. Eaton's role as an energy solutions provider can help you succeed in sustainability initiatives through world-class energy engineering and technology, reducing energy consumption and costs.

Energy audits and the energy-management process



EATON

Powering Business Worldwide

What is an energy audit?

An evaluation or study on how efficiently **natural resources** are being used in a business, facility and/or system.

This includes evaluating systems including, but not limited to:

- Building envelope
- Lighting
- HVAC
- Water
- Steam
- Compressed air
- Process system(s)
- Operation, control and maintenance of all of the above

How are energy audits used?

- They identify energy conservation opportunities (ECOs) that, when implemented, reduce energy consumption and cost
- Identify financially viable projects that 1) improve energy usage and/or efficiency, 2) improve application and utilization of alternative-energy sources or strategies and 3) reduce maintenance costs
- Provide knowledge that is used to allocate resources, make funding decisions, and drive energy-management strategies and planning
- Validate that energy management program initiatives and improvements are effective and being sustained

Steps in performing an energy audit

1. Historical energy usage data is collected and analyzed
2. The building and its operational characteristics are studied
3. Potential modifications and/or operational changes are identified that will reduce the energy use and/or cost
4. Engineering and economic analysis of potential modifications is performed
5. Energy conservation opportunities are summarized along with their corresponding savings and cost, so that next steps, prioritization and allocation of resources can be accomplished
6. A complete report is prepared that documents all the systems, analysis process and results

Energy audit tips

- An energy audit will ideally address energy goals and objectives that have been set for a facility, plant, campus, organization or corporation
- Looking at an entire facility—across all energy systems, sources (electric, gas, propane, fuel oil, renewable sources, etc.) and operations—provides the greatest opportunity to maximize energy cost savings and create projects that are financially viable
- Energy audits have to be repeated to ensure savings are sustained, programs are being effective and new opportunities are identified

Eaton is careful to analyze all aspects of energy consumption and optimization, including:

Technology

- Review & application of equipment and components that reduce energy consumption cost.

People/Energy Culture

- Review of organizational readiness and buy-in to energy management plans and goals.
- Level of awareness on how to support and improve energy-conservation initiatives.
- Can maximize no cost-low cost improvement opportunities.

Operational & Maintenance

- Strategies – Review of sequencing strategies, capacity optimization, energy recovery solutions.

Eaton's—Guarantee

Commitment to quality—if you are not completely satisfied with the quality of our work—specifically, the energy audit and/or cost savings methodology, cost savings, calculations, and support—you will not be charged. Eaton cannot predict the level or magnitude of the energy reductions and/or cost savings, but guarantee the quality of the Eaton approach, analysis, objectivity and methodology.

Our vision

Achieve an industry-leading reputation as a **Energy Solutions Provider** by helping our customers succeed in business and sustainability pursuits via world-class **energy engineering and technology** solutions that reduce energy consumption and cost.

Eaton's standard energy audit levels

Level 1

Major energy conservation opportunities will be identified, corrective measure briefly described, and quick estimates of energy reductions and cost are provided. Level of detail is sufficient to prioritize energy-efficiency projects and to determine the need for a more detailed audit, study or design.

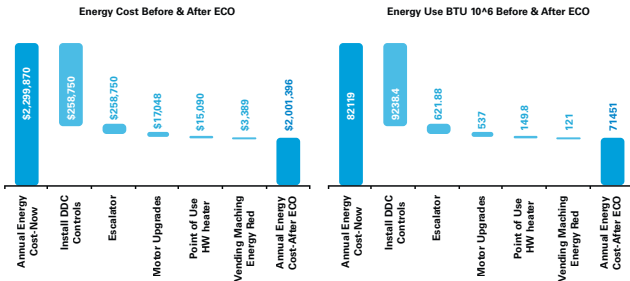
Level 2

Includes all the Level 1 benefits—plus goes into greater detail to identify all energy conservation opportunities appropriate for a facility, give its operating parameters. The level of detail is sufficient to justify project implementation and to commit design funds.

Custom Audit Scopes are also available, and targeted audits can be performed on select systems.

Projects with opportunities to conserve energy and utilities were investigated as part of this audit. The mechanical, electrical, plumbing and control systems were analyzed to ascertain in efficiencies, saving potential and project implementation cost. The combination of field surveys of the existing systems, engineering calculations using industry standards practices, application of energy efficient technologies and adherence to the building design best practices resulted in the recommendation of the following Energy Conservation Opportunities.

Number of Recommended Opportunities	Estimated Implementation Cost	Estimated Annual Savings	Simple Payback	Estimated Return on Investment (IRR)
7 Without rebate	\$1,684,673	\$354,204	4.60 YRS	19.33%
7 With rebate	\$1,624,673	\$354,204	4.58 YRS	20.4%



The following table depicts the energy impact of implementing the recommended Energy Conservation opportunities.

Annual Energy Cost	\$2,299,870	\$2,001,396	\$354,204	12.9%
Annual Cost\$ / Sq Ft	\$2.87	\$2.50	\$0.	12.8%
Annual BTU consumption BTU 10 ⁶	82.119	71.762	10.357	12.6%



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	Level 1	Level 2
Report Items		
No Cost—Low Cost Opportunities Identified	X	X
ECO Energy Saving (~% Accuracy)	+/- 20%	+/- 10%
ECO Cost Estimated (~% Accuracy)	+/- 20%	+/- 10%
Simple Payback Period (SPP)	X	X
ROI \ NPV \ IRR Financial Metrics	X	X
Audit Items \ Work Scope		
Lighting	X	X
HVAC	X	X
Compressed Air	X	X
Steam System	X	X
Building Envelope	X	X
Water (Potable)	X	X
Water (Process)		X
Analyze/Detailed View of HVAC Control System		X
Sequence of Operations		X
Measurement (Specific)		X
Onsite Interviews—General	X	X
Onsite Interviews—Maint. & Operations		X
Utility Bill Analysis (Elec., Gas, Water, etc.)	~12 Mo.	~12 - 36 Mo.
Building Modeling		X
Lighting Photometric		X
Delivery Time	6 - 8 days	3 - 4 wks

ECO: Energy conservation opportunity
 Custom audit scopes are available.

Typical energy conservation opportunities

Lighting

- Lamp/fixture technology
- Control, dimming, and automation
- Daylight harvesting

HVAC

- Control/commissioning
- Demand control ventilation
- Equipment maintenance

Gas driven absorption

- Type of hot water system

Boiler Drain

- Toilet using gray water

Technology

- Reflective and/or "green" rooftops
- Variable frequency drives (VFDs)

Compressed Air

- Demand Control
- Air Leak Programs
- Air Quality Optimization

Supply

- Alternative and renewable energy sources

Operations

- Capacity matches consumption—equipment that is maintained and operated efficiently
- Business operations and system control/alignment
- Retro or continuous commissioning

Steam line

- Insulation and gray water intergration

Co-generation

- Peak demand saving
- Effective use of exhaust heat
- CHP solutions