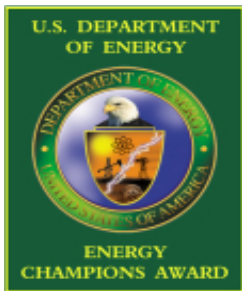


# Elements of an Energy Audit and Financial Implementation

Presented by:  
Robert Ragozine



# Energy Planning

- Comprehensive Energy Master Plan Approach
  - Investigate and analyze entire facility. Evaluate both supply and demand related systems.
- Create a short and long range plan incorporating strategies for both supply and demand strategies (i.e. purchase natural gas from a third party supplier saving \$ in per unit cost while installing a high efficiency boiler to reduce consumption).

# Energy Planning

- This Presentation will focus on Demand Strategies
  - Start the process by understanding your energy use and costs through collecting utility bill information and performing assessments of each building and process. This should enable you to benchmark your operation.
  - Address all opportunities for cost savings and operational improvements.

# Energy Audit Process

- Initial Meeting
  - Gather utility bills, floor plans, drawings.
  - Discuss problem areas to address: hot/cold spots, inadequate light levels, indoor air quality, etc.
  - Discuss financial parameters for project.
  - Discuss goals for project. Is it a capital improvement project or purely an energy savings project with a specific payback required.
  - Discuss recently approved projects, long range plans, etc.

# Energy Audit Process

- Site Visit: Conduct an inspection of each site and its operations, including interviews with facility personnel.
- Conduct a review and audit of all mechanical and electrical equipment and systems in each facility to understand their condition, age, operating characteristics, etc., and to identify potential energy savings or operational improvements associated with these systems. Also note potential failure scenarios for major equipment based on input from the staff, equipment age vs. mean life expectancy, etc.

# Energy Audit Process

- Types of Technologies To Consider:
  - Lighting and Lighting Controls
  - Motors and Pumps
  - Variable Frequency Drives (VFDs)
  - Energy Management Systems
  - HVAC
  - Combined Heat & Power (CHP)/Cogeneration/Peak Shaving/Demand Response
  - Boiler Upgrades
  - Geothermal Systems
  - Fuel Cells/Microturbines/Solar/Wind
  - Building Envelope (windows, roofs)
  - Water Technologies
  - Transformer Technologies (power factor)
  - Process Improvements

# Energy Audit Process

- After the energy audit is complete, a report is provided that outlines the existing conditions, and includes recommendations for improvements.
- The report should include annual savings from the recommended improvements, as well as a financial analysis with project costs, available financial incentives, a life-cycle cost analysis, and summary of environmental benefits (reduction in GHGs).

# Energy Audit Process

- Deliver a report of all findings, analyses and recommendations as they relate to equipment inventory and energy savings opportunities that can be realized by client. After reviewing the report, the public entity decides which projects to move forward with.
- Selected projects will require final engineering with cost estimates, to prepare bid specifications.
- The public entity prepares a resolution allocating funds for the project.

# Why Invest in Energy Efficiency (EE)?

- Both natural gas and electricity are deregulated. Deregulation of electricity has not resulted in lower prices through competition, it has resulted in significantly higher costs. Natural gas prices over the past few years have been at all time highs. ***By not investing in energy efficiency, you are costing your ratepayers a significant amount of money.***

# **Why Invest in Energy Efficiency (EE)?**

- Most projects have overall paybacks <10 years. Typically, our clients' projects have paybacks in the 4-6 year range.
- Assuming a 5 year payback, a typical project will achieve a simple 20% return on investment (ROI). It would be difficult, if not impossible, to find an investment that could guarantee even half that rate of return.

# **Why Invest in Energy Efficiency (EE)?**

- Most public sector facilities are not at risk to be shut down due to changes in the economy.
- Investments in capital improvements will provide savings to ratepayers well beyond the life expectancy of the equipment installed.
- Enables public entity to avoid needed capital expenditures by financing improvements through other mechanisms.

# Financial Implementation

- The State of NJ is offering rebates for energy efficiency.
- The State is anticipating \$30 million in stimulus money for “shovel ready” projects plus another \$60 million after that.
- Options for financing projects include: direct capital investment, financing through local Improvement Authority, performance contracts, lease-purchase, and the NJEITF.

# Financial Implementation

- Each day, week, month that passes without reducing energy consumption is money that can never be recouped.
- These programs become the mechanism for affording needed capital improvements. The savings from very cost effective improvements such as lighting retrofits can help pay for other projects such as HVAC improvements that are typically longer payback, but much needed, projects.

# Keys to Success

- Governing body/commissioners, administration, and engineering/public works departments all must be on-board with the concept.
- Decide on a financing mechanism.
- Treat the proposed program like a wish list. Look at every possibility for savings and building improvements. You can always eliminate items before you finalize the bid specs or establish multiple phases for the improvements.
- Do not base your investment decision on lowest first cost. Instead, look at life-cycle cost.

# Summary

- Summary:
  - Good Public Policy - Energy Conservation Initiatives are a win-win for public entities and the taxpayers.
  - Good for the environment.
  - Cuts back on U.S. dependency on foreign fuel.
  - Enables public entity to upgrade mechanical and electrical equipment.

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