

THE ENERGY OBSERVER

Energy Efficiency Information for the
Facility Manager

Quarterly Issue – June 2003

Examine Your Energy Project Potential

The Energy Observer summarizes published material about proven energy technologies and practices, and encourages users to exchange experiences with generic energy products and services. This quarterly bulletin also identifies informational sources and energy training for facility managers and staff. **The Energy Observer** is a service of the **Energy Office, Michigan Department of Consumer & Industry Services.**

Energy savings are available now! By replacing old inefficient equipment or by updating building technologies, commercial facilities can reduce their utility bills by as much as 60%. This issue is designed to help you to determine your facilities' energy project potential.

ANALYZING UTILITY USAGE

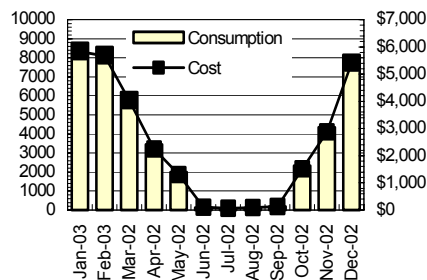
The first step to estimating your energy efficiency potential is to analyze how much energy is being consumed and where. This can be done by simply graphing your monthly usage. Gather 12 months of utility data; you will need both the cost and consumption data for each fuel. The gross square footage will also be required to complete the calculations in the next section.

Typically, your heating graph will coincide with the seasons (i.e. January's gas cost/consumption should be high and July gas cost/consumption should be low),

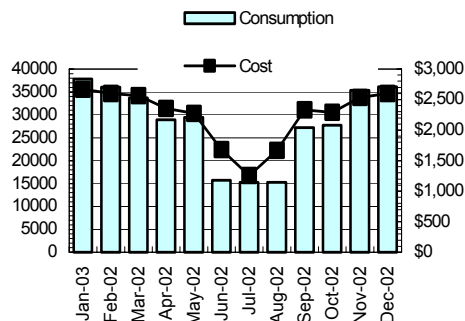
and your electric usage should remain relatively constant. Variations from the standard utility curves may occur with air conditioning, seasonal vacancy, specialty activities or construction.

Next, develop a graph for each building so that it is clear where the most energy is being consumed. After the utility data for each building has been analyzed, it will be easier to prioritize which buildings need the most attention. Below are sample utility graphs for an elementary school that operates nine months of the year.

Natural Gas Consumption Profile



Electricity Consumption Profile



Often by analyzing utility data, problems can be identified more quickly. Spikes in consumption or in cost will alert you or your staff to potential problems.

UNDERSTANDING THE DATA

After graphing the utility usage, it is important to understand what your utility data is telling you. You should examine three things for each building. First, calculate the average cost per unit of energy (kWh, CCF, etc.); knowing what you are paying can help when negotiating rates with your local utility. Next, calculate your energy cost per square foot. Finally, calculate the Energy Use Index (EUI). By calculating and comparing these values for each building, you will have a better understanding of your potential savings. The above calculations are simple and can be calculated easily. Refer the examples on page two for the method of calculating.

Comparison of these values varies by size and type of building. For a general guideline, the total EUI should be below 90,000 BTU/ft² and the cost per square foot should be less than \$0.90. These values are approximate values and are representative of a limit not a goal. Buildings that have extended hours or functions that use high amounts of energy will vary from these guidelines. A more accurate comparison can be generated by benchmarking your

Example Calculations for an Elementary School

(All Data is given for a 12-month period and reflects annual usage)

Gross Square Foot: **62,200** ft²

Natural Gas Consumption: **23,962** ccf Natural Gas Cost: **\$14,029**

Electricity Consumption: **291,160** kWh Electricity Cost: **\$24,616**

KWH Equivalent: **3413** BTU/kWh CCF Equivalent: **103,000** BTU/ccf

Cost per unity energy

Cost per ccf: \$14,029 / 23,962 = \$0.59 per ccf

Cost per kWh: \$24,616 / 291,160 = \$0.09 per kWh

Cost per square foot

Natural Gas: \$14,029 / 62,200 = \$0.23

Electricity: \$24,616 / 62,200 = \$0.40

Total cost per square foot: \$0.23+\$0.40 = \$0.63

Energy Use Index (EUI)

Natural Gas: $(23,962 \text{ccf} \times 103000 \text{BTU/ccf}) / 62,200 \text{ft}^2 = 39,680 \text{ BTU/ft}^2$

Electricity: $(291,160 \text{kWh} \times 3413 \text{BTU/kWh}) / 62,200 \text{ft}^2 = 15,976 \text{ BTU/ft}^2$

Total EUI: $39,680 \text{BTU/ft}^2 + 15,976 \text{BTU/ft}^2 = 55,656 \text{ BTU/ft}^2$

buildings using the ENERGY STAR database.

FACILITY EVALUATION

Conducting an energy audit of each building is the next step. Some energy service companies and government programs will perform free walk-through energy assessments for buildings or for a component or system within the building. Self-assessments can also be completed; the type of self-evaluation in a facility depends on the knowledge and experience of the staff. The purpose of an energy assessment would be to identify systems or

equipment that need to be replaced or improved. Regardless of who performs the energy assessment it should include a look at the building envelope, lighting, space heating and cooling, water heating and distribution and plug loads.

Once you have identified the systems and equipment that need to be replaced or improved, a detailed analysis should be completed by an energy efficiency professional. These professionals can provide the building owner/operator with a comprehensive analysis that identifies the cost to implement an

energy efficiency project, the estimated energy savings and a payback time. A payback is the amount of time it takes a defined project to pay for itself through energy cost savings.

FOR MORE INFORMATION...

Visit the Energy Office website to learn about the School and Local Government Energy Services Program. Find out how the Energy Office can assist you with these steps.

www.michigan.gov/eoslgei

ENERGY STAR offers *free tools and seminars* for evaluating building performance and equipment efficiency.

www.energystar.gov

Visit the Energy Office website for information on current programs, services, past issues of *The Energy Observer* and grant information.

www.michigan.gov/energyoffice

For more information on this issue or past issues of *The Energy Observer*, please contact:

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