Adding Value to Energy Management By Benchmarking

As the person responsible for the operation of your facility, you know first-hand the role energy consumption plays in its overall performance. Reducing energy costs while improving building performance is a key responsibility for every facility manager and their engineering and maintenance team.

Improving the energy performance in your facility gives you a chance to contribute to the bottom line and ultimately, increase your value within the company. By suggesting cost-effective solutions that improve performance while lowering energy bills you provide a comfortable environment while minimizing costs. Increasing energy efficiency also allows savings to be redeployed – perhaps to a new initiative supporting the company's mission or to update your facility's equipment.

This article will provide you with an overview of free tools and resources through EPA's ENERGY STAR® Buildings Program, many of which the BOC program reviews in the Level I class on Energy Conservation, and will help you get started managing energy costs in your organization.

"If you can't measure it, you can't manage it"

This adage is gospel in the building community. It is especially relevant to the energy performance of a building. In order to effectively manage your building's energy use, you first need to know *HOW* your building is operating and currently using energy.

Knowing your actual energy consumption will enable you to evaluate current maintenance procedures, ensure proper equipment installation, or implement other practices that can save significant amounts of energy. Without this information to serve as a guide, perceived improvements could be rendered ineffective and a waste of capital.

There are many ways to measure energy use within an organization. Energy performance can be measured and expressed in terms that add priority to energy management activities for your organization. Examples include:

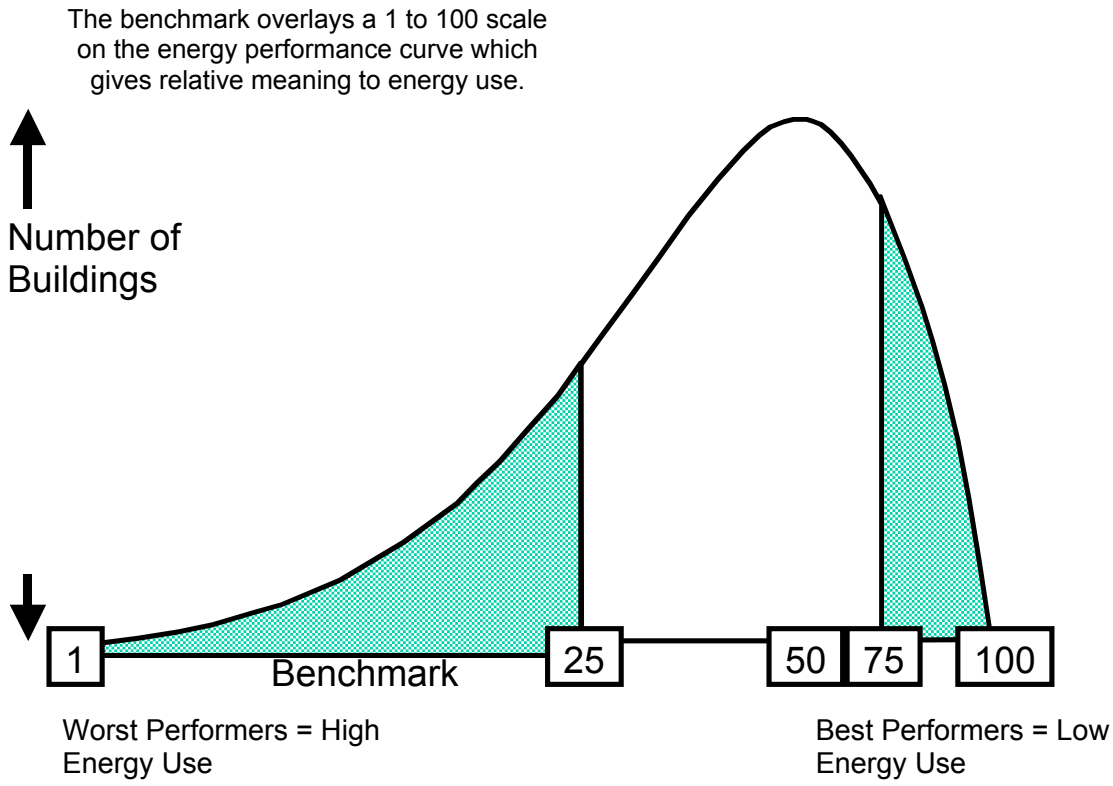
- EPA's Energy Performance Rating System
- Energy Utilization Index (Btu/square foot)
- Total energy cost/square foot

An effective energy management program is not a one-time energy improvement project but rather a continuous process. It allows you to incorporate a set of proven procedures into your business practices that can lead to continuous energy cost reductions while minimizing the time spent on identifying and achieving those reductions.

Using ENERGY STAR® To Measure and Reward Building Performance

ENERGY STAR® offers free tools and resources to help facilities managers and engineering staff measure and evaluate building energy performance. ENERGY STAR® Portfolio Manager is a nationally recognized benchmarking tool for measuring energy performance. The figure below illustrates how the rating system provides an objective, standardized metric for measuring the efficiency of a building or building portfolio on a scale of 1 to 100. The distribution of performance is a modified bell curve.

1 to 100 Benchmark Scale



Buildings scoring below 25 are poor performers and typically cost more to operate. Buildings scoring 75 and above are the best performers and have lower energy costs.

Portfolio Manager provides a rating for your facility based on a 1-100 scale, with 1 representing the poorest performing buildings and 100 representing the best performing buildings. The rating is an indication of how your facility uses energy compared with similar buildings from across the United States. The resulting score can also be used to identify the opportunity to improve energy performance in a building. For example, a building with a rating of 40 is only performing better than 40 percent of similar buildings; therefore, 60 percent are doing better. Buildings that score a 75 or greater on the 1-100 energy performance rating scale and meet current indoor environment standards are eligible for individual recognition through ENERGY STAR.

Success Stories

ENERGY STAR's National Energy Performance Rating System has helped a variety of organizations streamline their business systems while using energy performance trends to make budget and investment decisions regarding energy-related projects. Following are just a few examples of how organizations ranging from school districts to cancer centers have successfully used Portfolio Manager to improve their bottom line.

Newark Unified School District (in Alameda County, California) used Portfolio Manager to benchmark 15 district buildings to prioritize investment-grade energy audits. All 15 sites were ranked according to energy performance rating and since some of their buildings were constructed at the same time and from similar plans, district managers were able to compare occupant behavior between sites. Given that behavioral changes usually require less capital investment and planning than efficiency retrofits, they were able to improve efficiency by raising staff awareness of energy use and its impact on the district's budget.

Hilton Hotels Corporation, which owns and operates more than 530 properties totaling nearly 160 million square feet, became an ENERGY STAR partner in 1996, and implements an energy management plan for each of its hotels based on the ENERGY STAR strategy. Quarterly benchmarking results are sent to general managers (management staff) and energy audits are conducted on the hotels performing the poorest. Benchmarking reports describe the hotels' performance based on a variety of metrics, including energy cost per square foot, energy cost per room and energy cost as a percent of revenue. Each property has an energy management team responsible for meeting energy-efficiency goals using best practices, new technologies and corporate purchasing guidelines. The company's ultimate goal is to reduce operating costs by decreasing energy use by at least 5 percent and increasing their overall Portfolio Manager benchmarking score by 5 percent.

The City of Hope National Medical Center (COHNMC) is a comprehensive cancer center that is saving $490,000 annually on electric bills from increased energy performance. To achieve this success, COHNMC implemented a tiered energy management program incorporating ENERGY STAR's integrated approach to facility upgrades, investment in energy efficient equipment and careful management of how and when energy is needed. Their significant energy savings were a direct result of investments in a campus-wide lighting retrofit, a new central plant with high-efficiency centrifugal chillers, variable-speed drives for fan and pump motors and in a thermal energy storage system. An energy management system properly monitors and controls energy use and their energy management team runs campus-wide education and awareness campaigns to share strategies and educate their local medical community.

Adopting the ENERGY STAR guidelines for energy management distinguishes your organization as an environmental leader while improving your energy and financial performance. For the Portfolio Manager Tour, visit https://www.energystar.gov/istar/pmpam/help/Portfolio%20Manager%20Tour/Portfolio_Manager_Tour.htm and start saving today!

Reducing energy use and increasing energy performance provides "the most bang for your buck," often offering high returns on investment. ENERGY STAR, through its **Guidelines for Energy Management** offers a proven process for minimizing energy waste and maximizing building operations in your facility. The remainder of this article's discussion on the **Guidelines** can be found on The BOC web site. Please go to www.theboc.info to continue.

Prioritizing Efficiency (Improvement) Projects

Benchmarking can serve as an important first step towards successful energy management. After establishing a building's energy performance rating, energy managers can prioritize efficiency improvements by examining operational needs and existing equipment to determine where improvements can be made.

In order to provide a uniform system of measuring the energy performance of facilities from across the country, the U.S. Environmental Protection Agency (EPA) developed the Energy Performance Rating System or Portfolio Manager (as it has become commonly known). EPA's Energy Performance Rating System provides businesses with a method to compare their energy performance against that of other businesses in the same sector.

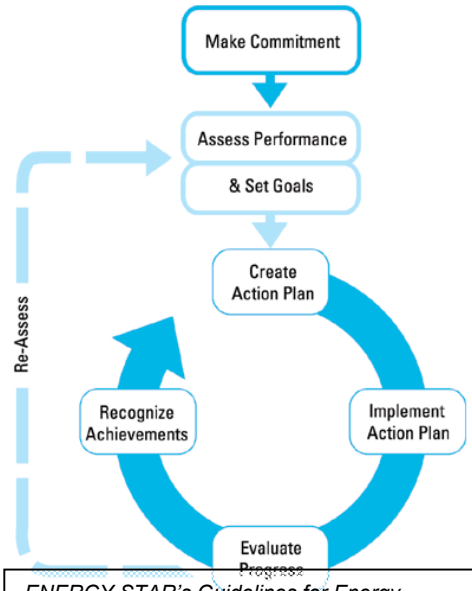
To calculate this score, Portfolio Manager requires only 12 months of a facility's utility data and the size of the facility (measured in square feet) to develop an Energy Utilization Index (EUI).

The result is a metric of energy use expressed in thousands of British Thermal Units per square foot (kBtu/sq.ft.) of the facility.

Once an EUI is developed, Portfolio Manager then normalizes the data for variables such as climate, occupancy, operating hours and size so that a 10,000 square foot office building in Minneapolis Minnesota can be compared with a 15,000 square foot office building in Phoenix, Arizona. The data needed to create the comparison comes from the Commercial Building Energy Consumption Survey (CBECS) database – collected by the US Department of Energy every four years. Comparison with this large national database of over 67,000 buildings is possible because the regional climate and weather differences are accounted for in the rating system.

Managing Building Energy Performance and Operating Costs
ENERGY STAR® Portfolio Manager is a practical and effective resource that provides a valuable energy performance tool for the commercial building sector. Based on the concepts of whole building performance and continuous improvement, Portfolio Manager is designed to help businesses achieve their financial goals while keeping an accurate pulse on building performance. Sector-specific building types include: offices (general, financial centers, bank branches, courthouses), warehouse and storage, supermarket/grocery, hotels/motels, hospitals, medical offices, residence halls/dormitories and K-12 schools. Therefore, Portfolio Manager is an industry-specific tool that ranks buildings compared to others with the same space type.

Setting Performance Goals
Improving energy performance can result in a multitude of benefits for businesses. These include gains in worker productivity, increased sales (attributable to efficiency upgrades) and an enhanced corporate image. Successful companies have used EPA's Energy Performance Rating system through ENERGY STAR's Portfolio Manager program to calculate energy use benchmark scores for selected facilities as part of their energy management strategies. ENERGY STAR provides tools that quantify, justify and communicate the impact of energy performance to a company's worth.



ENERGY STAR's Guidelines for Energy Management provide users a strategy for improving energy use in their facilities. Visit www.energystar.gov to learn more.

Additional Information

ENERGY STAR Commercial & Industrial Tools

- Portfolio Manager - National Energy Performance Rating System
- Directory of Energy Efficiency Programs (DEEP) - National online directory of local energy efficiency programs.
- Financial Value Calculator - Relates energy improvement investments to increased profit margins, earnings per share, and shareholder value. Building Upgrade Manual - Provides/Outlines a 5-stage approach for energy upgrades that include operations and maintenance, lighting, load reduction, fan systems, and heating and cooling.

With ENERGY STAR, money isn't all you'll save!
Whether your business is education, retail, manufacturing or healthcare, you can profit from a new source of value by adopting energy management best practices that promote exemplary energy performance in your buildings. If all US consumers and businesses were to choose ENERGY STAR products and building upgrade strategies over the next decade, the national annual energy bill would be reduced by about $200 billion. Consumers and businesses would not only save money but would also make a huge reduction in air pollution and contribute to

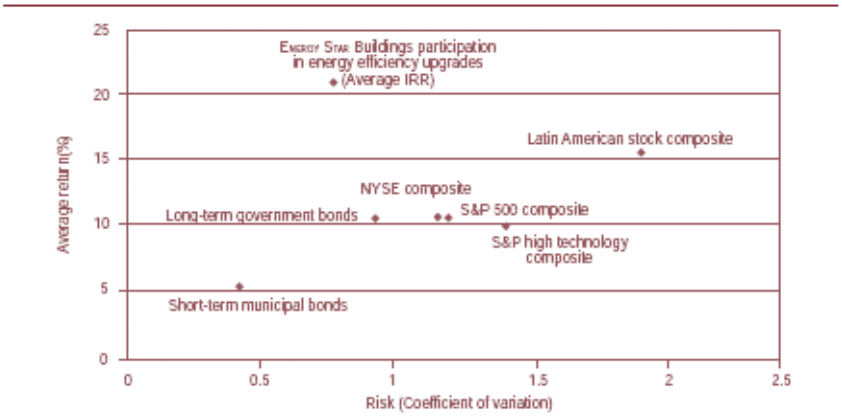
protecting the earth's atmosphere for future generations. ENERGY STAR has contributed to 6.4 million metric tons of carbon reductions and 31.6 billion kWh savings since the inception of its flagship program.

Energy efficiency prevents pollution and is good for your bottom line as well as the environment. Your organization will save the money that was previously spent on energy-wasting equipment and technologies. Reductions in energy consumption also enable you to deliver products and services at a lower cost and increase profits, which means being more competitive. The potential savings from an integrated approach to energy-efficient upgrades can be 35% or greater. For example, energy bills for existing U.S. commercial space (approximately 78 billion square feet) total $110 billion annually. EPA estimates that increasing the energy efficiency of this space could save more than $25 billion. In addition to dollar savings, there are several other benefits for incorporating energy efficiency into your business strategy:

- ENERGY STAR upgrades offer superior returns at a lower risk than many other investments (see Figure 1). Improvements in energy performance and employee comfort can increase productivity in your upgraded buildings; in fact, revenue generated from increased productivity can be 10 times as high as the energy cost savings received from performing upgrades.
- Every dollar invested in an energy-efficient upgrade can produce between $2 and $3 in increased asset value, which can make commercial properties more attractive to buyers and lenders.

Improving energy performance offers long-term, low-risk returns, reductions in energy consumption and costs, increases in worker productivity and improved asset value, few other investments can do all that. And each day that you delay your decision to upgrade, you lose those potential savings forever.

Figure 1: Risk vs. Return



Benchmarking and Utility Rates

Benchmarking can also help facility managers assess whether or not a rate analysis would benefit their utility expenditures.

Each utility has several rates that apply to each customer class. In some cases the rates are mandatory, depending on the building size and customer class. In others there may be as many as four options. Some common rates include: time-of-use (TOU) rates and flat rates. On a flat rate, the cost for each unit of energy, or demand (kW) that the facility requires, and the amount of energy used over time (kWh), remain the same regardless of what time of day the energy is used. The only variation in price occurs during seasonal changes when costs are lower in the winter months as compared to the summer months. Flat rates are best suited for facilities that operate

during standard weekday hours and are unable to shift use to the less costly shoulder or evening hours.

Time-of-use rates charge different amounts based on the time of the day the energy is used, with higher costs being incurred during the middle of the day when the demand is the highest on the electric system (i.e., noon to 6:00 p.m. summer weekdays). These rates are best suited for facilities that can shift a large portion of their load to the off hours, are already using a lot of energy at night and on weekends or have a 24-hour operation.

BOC & ENERGY STAR®

BOC joined the ENERGY STAR Partner Program in 2004 to bring the many practical free tools and resources it offers to BOC students, graduates, and their facilities. BOC enrollees use the benchmarking tool in their homework assignment for Level I. The benchmark generates an energy use index (EUI in kBtu/sf/yr) for the building which can be used as a baseline for measuring performance changes over time.

Starting this Fall, BOC graduates will have the opportunity to earn continuing education hours for benchmarking their facilities with ENERGY STAR® Portfolio Manager and monitoring performance changes on an annual basis. For more information, check out the BOC web site at www.theboc.info.

About the Author
Derek Greenauer is an account manager for D&R International, a consulting firm working on behalf of the U. S. Environmental Protection Agency on ENERGY STAR commercial buildings. Mr. Greenauer has been working with investor-owned and municipal utilities a like to design and implement cost-effective energy efficiency programs targeted at the commercial building market. Mr. Greenauer also monitors policy developments at the State level to better anticipate the direction energy efficiency efforts are heading and develop strategies for ENERGY STAR to proactively use to engage these states.