

ENERGY

Benchmarking boom

by richard g. lubinski

» Data links consistent Energy Star benchmarking with savings.

» Fines add teeth to energy benchmarking laws.

» Getting past limitations.

While energy benchmarking is not a new practice, it is becoming more mainstream as states and cities are starting to mandate annual energy reporting. State and local governments are now leveraging the power of the Energy Star Portfolio Manager database. The Energy Star database enables building owners to see how their annual energy use intensity (EUI) stacks up against comparable buildings — in the same climatic regions. Portfolio Manager has become the de facto standard for benchmarking energy use for owners interested in LEED: Building Operations + Maintenance certification, and it is now the standard for government mandated energy benchmarking and disclosure

laws. While still in its infancy, government-required energy-use disclosure is becoming more common.

Despite the obvious usefulness of energy benchmarking, there were challenges before Energy Star. For example, it might seem obvious to compare energy costs as a way of benchmarking. The problem is that energy rates vary widely across the country and even within local geographic areas based on a variety of factors. Therefore comparing energy costs alone for various buildings is problematic. Two identical facilities with different utility rates and located in different climate regions might have their energy cost vary by 100 percent.

What makes utility bill data man-

Energy Star: apples to apples

With most energy benchmarking metrics, FMs may not get accurate building-to-building comparisons.



Energy costs are of high interest, but of limited value for comparing different buildings.

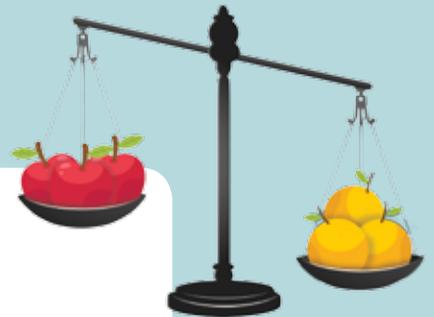


ENERGY STAR

Shows energy performance relative to comparable buildings (e.g., same type, climate) on an intuitive, 1 – 100 scale. Widely used and recognized.

KWH/SF

Energy consumption measures are not affected by variations in utility rates and charges, but are distorted by factors like building type and climate.

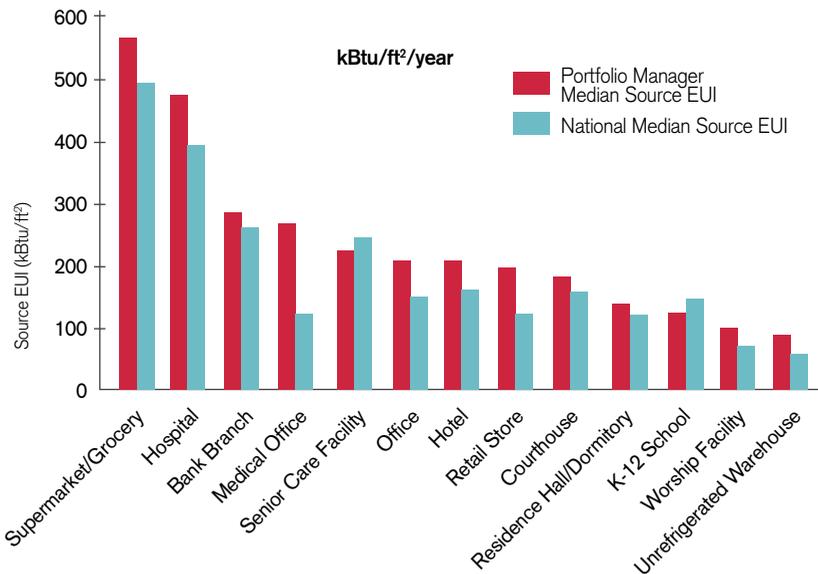


EUI

Simpler than kWh/sf, but subject to same limitations.



EUI: Varies by building types



Some building types excluded due to inadequate data and/or EUI values beyond this range.

Source: Energy Star.

The more FMs follow up energy benchmarking with audits and energy conservation measures, the greater the payback.

agement even more challenging is the fact that electric and natural gas charges are billed in different energy units depending on the utility company and individual utility rates. While kWh is the common metering and billing unit for electric bills, many rates include charges for electrical peak demand (kW), power factor (kVA), and other factors. The electric bills became much more complicated because of electricity deregulation, which separated electric distribution from the electric commodity.

The same is true for natural gas bills, but the billing process is less complicated. Natural gas is billed based on volume (hundreds of cubic feet or CCF, or thousands of cubic feet or MCF) or volume with heat content adjustment (therms or decatherms). Third-party utility databases are normally converted to one measurement (such as kWh and therms) for reporting.

Today, many companies serious about utility cost control also track energy consumption in addition to energy cost. This approach tracks electrical consumption and natural gas consumption based on square footage — ignoring the cost factor.

One way to do that is to track energy

consumption in kWh for electricity and therms for natural gas, with both based on square feet. That way, facility managers can compare buildings by kWh/sf. Another benchmarking option is energy consumption in British Thermal Units (BTU) per square foot. To make the data easier to read, this can be turned into EUI, measured in thousands of BTUs per square foot (kBtu/sf). This EUI measurement tool ignores the cost of energy and the relative cost of electricity compared to natural gas.

Comparing EUI can lead to some surprising results. Many older buildings are more efficient than newer buildings. Some buildings that are not LEED certified are more energy efficient than LEED certified buildings. But EUI is not the whole story.

Limitations of EUI

EUI varies by building types. For example, a grocery store has a much higher EUI than a distribution warehouse. The type of energy-using equipment in certain buildings varies widely. Some buildings have full HVAC for tenant comfort (office buildings, for example), and others (like most warehouses) only have heating. In some buildings, electricity or natural gas is used for production (for instance, restaurants, full-service hotels, and manufacturing plants).

What's more, regional climate also has an impact on energy consumption. An office building in Florida might use a chiller for its air conditioning needs 11 months per year, and another office building in Minnesota might only need to run a chiller a few months a year in the shorter summer season. Water-side and air-side economizers also provide "free cooling" during some winter months so the chiller can be turned off. Two buildings may have comparable kWh consumption but one may have lower cost due to thermal energy storage (where ice or chilled water is made during off-peak times with lower cost electricity and used to cool the building during the day, when rates are higher).

Portfolio Manager solves both of the problems related to EUI. The Energy Star score is based on a building's energy consumption compared to similar buildings. It tracks electrical consumption and natural gas consumption based on square footage — ignoring the cost factor. Portfolio

Manager adjusts for such factors as building type and regional climate. The result is a true apples-to-apples comparison that can be used to guide plans for improving energy efficiency.

If energy benchmarking is done correctly and is followed up with action, a facility ends up with lower energy costs, lower maintenance costs, and better lighting or better comfort or both, and in the process improves the value of the building.

Portfolio Manager can also be used to track water consumption and waste, the latter a recent upgrade.

It's the law

Today, energy benchmarking may bring another benefit: The property can avoid fines for failing to follow requirements for energy benchmarking reporting. State and local governments across the nation have enacted laws to require energy benchmarking, so the facilities affected need to set up the process of annual reporting or they may face a fine. In general, the states and cities that have passed energy benchmarking laws do not have mech-

Paying the energy benchmarking fine is wasting money better spent on energy efficiency improvements for buildings.

Many cities only report macro data on how buildings in their area are doing with EUI and their average Energy Star scores. Some cities are tracking EUI over time to determine if their energy benchmarking requirements are motivating building owners to take action to reduce their energy use. A few cities are planning to publish the EUI of each building so the public can see the relative energy efficiency of different buildings — including buildings competing for tenants. In the future, a customer might decide to rent office space in building A or building B based on their combined EUI and rental cost per square foot — in other words, the total cost of occupancy. Theoretically someone visiting a town would have the option to go to a government website to determine which hotel they will stay at based on EUI or Energy Star score.

Once companies or government agencies start to look at the EUI data, some buildings stand out as being energy efficient and while others are

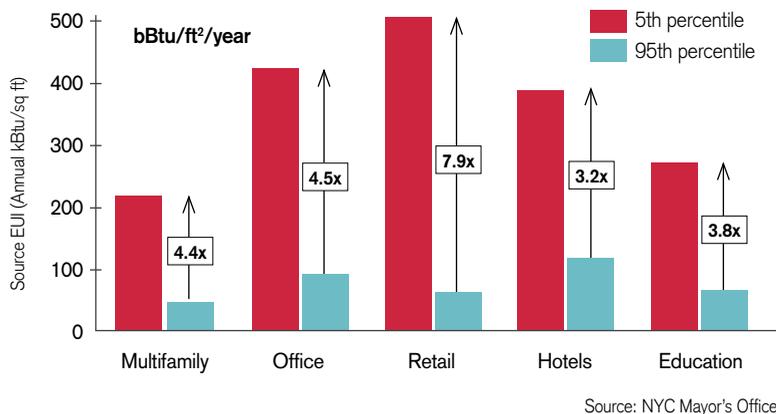
Buildings that benchmarked using Portfolio Manager for three consecutive years achieved annual energy savings of 2.4 percent, according to an Energy Star study.

ergy reporting and Energy Star building scores reveal problem buildings that are also opportunities for great return on investment (ROI). An Energy Star study of 35,000 buildings showed that buildings that benchmarked using Portfolio Manager for three consecutive years achieved annual energy savings of 2.4 percent, with a total savings of 7 percent over three years. The buildings' Energy Star scores increased over that time by an average of 6 points. The more that benchmarking motivates facility managers to perform energy audits and implement energy conservation measures, the greater the reduction will be in energy use.

The energy engineering that follows this preliminary data reporting can be complicated. An independent certified energy manager (CEM) can guide facility managers to a more comprehensive understanding of the causes of high EUI in relation to each building's design, mechanical/electrical/plumbing (MEP) systems, operating requirements, and local utility consumption and cost history. The goal is to identify realistic energy-related improvements using conservative assumptions to generate realistic financial projections of simple payback, return on investment (ROI), net present value (NPV), internal rate of return (IRR), plus the eventual impact on net operating income (NOI) and asset appreciation. Like most things in business, there will be competition for investment dollars between energy conservation measures and

NYC: EUI comparisons show wide swings

Variation in source energy use intensity (EUI) within five sectors.



anisms for avoiding the stated fines.

To avoid paying fines, the energy-use data must be collected and uploaded into the Energy Star Portfolio Manager database before the specified deadlines. Smart companies will also use this data to better manage their facilities and to guide them towards cost-effective energy efficiency projects.

shown to be energy hogs. The EUI measurement tool clearly identifies which buildings need energy management audits and investments and which buildings do not. The old management theory that you can't control what you don't measure rings particularly true when looking at the EUI of various properties. Government-mandated en-

Tracking every drop

Water consumption is becoming a required third utility to track; indeed, water-consumption benchmarking is mandated by some benchmarking laws. It can be done with Energy Star Portfolio Manager. Most utility databases track water use in CCF (hundred cubic feet — sometimes called “units”). Sewer cost and volume can be tracked as part of the water bill or tracked separately. Based on sub-metering factors, the volume of water can be different than the volume of sewer billed for a given month.

— Richard G. Lubinski



other business interests. In recent years there are also other considerations impacting ROI such as demand-side management rebates, alternative funding options including government-based public financing, on-utility bill financing, and energy saving performance contracting in some cases.

Business necessity

Benchmarking energy consumption and cost is no longer a nice thing to do but a business necessity for financial, governmental, and environmental reasons. Even some utility companies are motivated to care about facilities' EUI, with government-mandated demand-side management programs intended to encourage energy conservation and thereby reduce the utility company's capital investments (and eventually to save the facility money with lower utility rates). Intelligent energy efficiency investments meet a definition of a win-win for all involved. Intelligent energy management and en-

ergy management investments help ensure a company's long-term profitability, provide owners and investors with predictable long-term returns, and positively impact the organization's image with tenants, investors, and the public at large. As the expression goes, “failure is not an option.”

Serious business owners also plan for the measurement and verification of the actual energy savings generated by energy efficiency investments. Energy benchmarking tools combined with a certified energy manager to support energy efficiency efforts will provide senior management with the needed reporting on the real world results of energy efficiency projects. ■

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