Healthcare Energy-Savings, Part Two:

On the Road to Efficiency.

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A past article (Healthcare Energy Savings, Part One) focused on how to calculate a building's Energy Use Index, one of the first steps in the process of evaluating your healthcare facility for energy improvement opportunity. To recap, the facility **Energy Usage Index** (EUI) is the amount of energy used annually per square foot of conditioned space (heated or cooled, or both) and is a basic measure of the facility's energy performance- the smaller the number the better! The article also established an **Energy Usage Profile**, which highlighted where energy consumption occurs within the facility.

An additional measure that can be used to evaluate a buildings energy footprint is the **Energy Cost Index** (ECI). This is the dollar cost of energy used annually per square foot of conditioned space. To compute a facility's ECI you need to identify all the energy used in the facility and aggregate the associated costs. Determine the total square footage of conditioned space and divide the total dollars of energy used per year by the square footage of the space.

For example, a facility with **10,000 square feet** of conditioned space uses **$800** of **gas** and **$12,000** of **electrical** energy in a year. What is the facility's ECI?

- Total cost = ($12,000 + $800) / yr. = $12,800 / yr.
- **ECI=** $12,800 / 10,000 sqft = **$1.28 /sqft / yr.**

Regardless of whether EUI or ECI is used, a metric has been established from which a facility's energy consumption can be compared to others within the same industry. Both measurements indicate how much energy is being used (one in Btu's and the other in dollars). *However, these measurements alone may not provide insight into the true efficiency a building, particularly if comparisons are made within an industry of poor energy-performers.* The ECI is often preferred by financial decision makers, who find dollars easier to relate to than Btu's. So how then can the building's ECI be used as a useful measurement that can define opportunity and gain management's approval for energy-efficiency project funding?

According to research published by E Source Companies, LLC (1), the average cost of power (per square-foot) for hospitals in North America is approximately **$2.84** for electricity and **$0.94** for natural gas. A typical 500,000 square-foot, 200-bed hospital in the U.S. would spend **$1,890,000** ($9,450 per bed) annually on electricity and natural gas. This information is supported by research published through Health Facilities Management Magazine's 2011 Hospital Energy Management Survey (2) which estimates the median U.S. acute care hospital's energy cost to be between **$3.01- $4.00** per square-foot. Information like this may be helpful if a facility's actual energy consumption is unknown or if an estimate derived through profiling is acceptable.

Using the previous 500,000 square foot example, the ECI for a typical North American hospital and the Energy Usage Profile previously developed, the cost of energy can now be distributed across the various building loads. This defines where and at what cost energy is being used. Ranking consumption helps quickly identify the areas with the greatest opportunities for savings.

Thermal Energy Usage Profile: Hospital in Houston, Texas.

Process	Consumption %	Dollars $	Rank
Outdoor-Air Heating	7	$32,900	3
Reheat	65	$305,500	1
Space Heating	15	$70,500	2
DHW Heating	3	$14,100	5
Dietary/Sterilizers	5	$23,500	4
Distribution Losses	5	$23,500	4

(500,000 sqft X $0.94/sqft gas = $470,000/yr. utility cost)

Electric Energy Usage Profile: Hospital in Houston, Texas.

Process	Consumption %	Dollars $	Rank
Lighting	14	$198,800	4
Misc. Electrical	15	$213,000	3
Outdoor Air Cooling	5	$71,000	7
Space Cooling	17	$241,400	2
Fan Heat/Losses	5	$71,000	7
Cooling Tower/Cond. Pumps	9	$127,800	5
CW & HW Pumps	6	$85,200	6
Ventilation Fans	24	$340,800	1
Heating Auxiliaries	5	$71,000	7

(500,000 sqft X $2.84/sqft electric = $1,420,000/yr. utility cost)

After establishing how much is being spent on energy, a preliminary estimate of possible savings can be made based on past experience or industry rule of thumb. The following information has been used to define the percentage of energy cost savings deemed feasible for the example cited above:

- According to the **Association of Energy Engineers** (3) no-cost or low-cost operational changes can often save facility's 5-15 percent utility bills. Capital cost programs with payback times of two to three years can often save an additional 10-15 percent. Major capital cost programs with payback times of seven to ten years can save an additional 15-20 percent.

- The **Healthier Hospitals Initiative** (4) says reductions in energy use of 18 to 20 percent ere achievable using current standard technology coupled with minor capital expenditures costing 1-2percent. Upfront expenses are paid back to the institution in three to five years, which equals considerable savings over the life of the buildings.

This 500,000-square-foot (200-bed) hospital spending **$1,890,000** annually for energy could see a reduction of **$189,000** per year from its utility bill with a modest 10 percent reduction in energy use, or improvement in energy efficiency. This can be achieved through implementing no-cost or low-cost procedures designed to generate a quick return on any upfront investment.

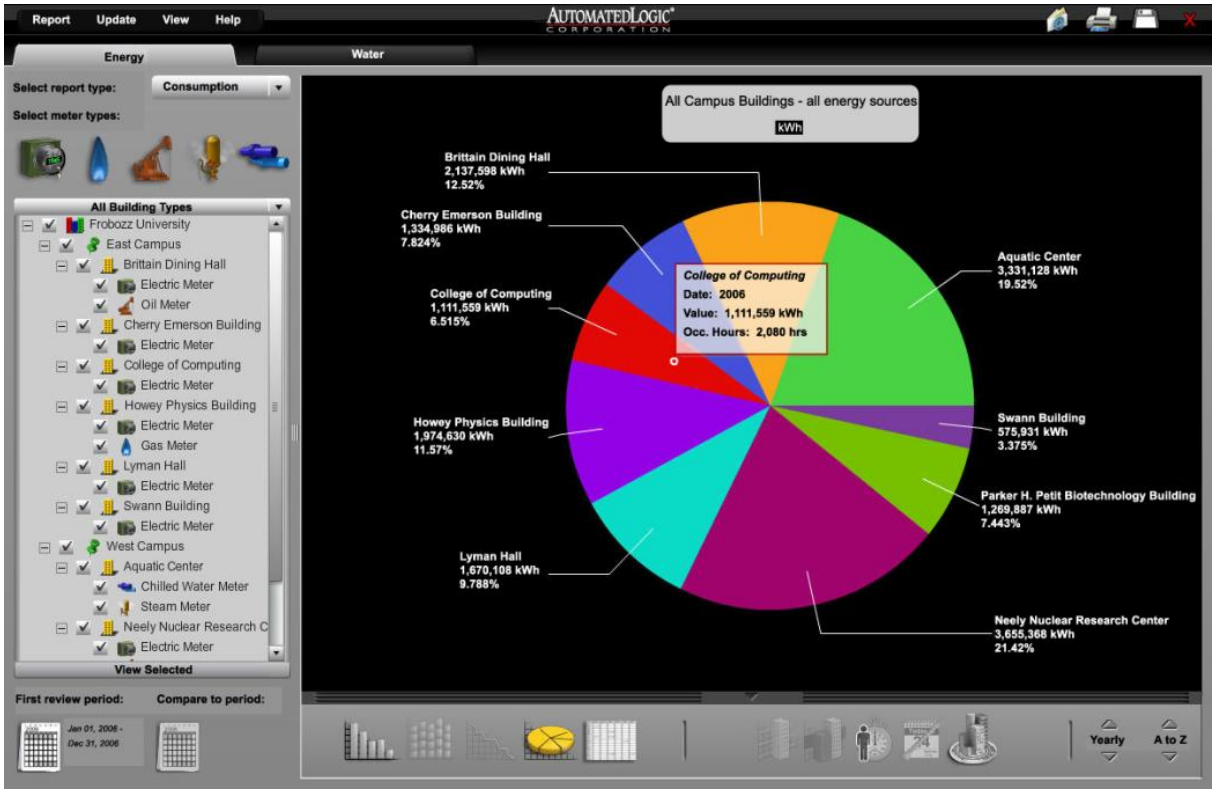
ENERGY STAR reports that for every $1 a nonprofit healthcare organization saves on energy, it has the equivalent impact on the operating margin of increasing revenues by $20 for hospitals or $10 for medical offices, assuming a 5 and 10 percent operating margin respectively (5). Based on this analysis, **$189,000** saved in energy cost is equivalent to generating new hospital revenues of **$3,780,000** per year. This comes with no expense tied to additional hospital floor space, staff, patients or liabilities (HAI's, malpractice claims, etc.).

Through these calculations, a reasonable target for energy savings has been established and additional benefits resulting from these savings identified. This information is helpful in forming an energy-efficiency initiative that will be well received and make for an "eye-opening" financial opportunity for decision makers. A determination can now be made on funding for more in-depth energy analysis designed to pinpoint opportunity and define reward.

Ultimately, three key economic factors drive the feasibility of any **Energy Conservation Opportunity** (ECO): implementation cost, energy cost savings, and the owner's minimum attractive rate of return (MAAR). Identifying projects that will provide the maximum value (financial return) will improve the likelihood for a desired outcome. The next article in this

series will build upon the information presented so far to identify those ECO's which are best positioned for success.

Note: No substitute exists for a building's "real" energy data, whether gathered from on-site energy meters or through utility bills. Measuring energy consumption is a starting point for process improvement, and referencing an established baseline will help justify investments to improve performance. It is true that you can't manage what you don't measure.



Utility Data Management & Energy Reporting

Software as a Service (SaaS) providers offer web based Utility Data Management and Energy Reporting Tools that require no additional software, hardware or in-house expertise. Users simply launch a web browser to view accurate, current metrics of a building's energy consumption. By providing complete data management, this makes the tool a low cost, administrative-free option. The service works directly with the customer's utility providers (gas, electric, water, etc.) and standardizes the information so the client has data that is immediate and actionable. This is an excellent way to produce an accurate Energy Cost Index for any facility, some even manage an ***ENERGY STAR®*** *portfolio at no additional expense.*

References:

(1) E-Source Companies LLC, 2010; Managing Energy Costs in Healthcare.
(2) Health Facilities Management Magazine; 2011 Hospital Energy Management Survey.
(3) The Association of Energy Engineers; Basics of Energy Management Handbook.
(4) Healthier Hospitals Initiative; Leaner Energy Fact Sheet 1/25/2012.
(5) Energy Star; Energy Star for Healthcare Website

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