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### **Saving Energy: Fact vs. Myth**

Given these tough economic times, we are all searching for ways to cut spending. A great place to start is operational energy costs. What measures should I take? How much will it cost? This is not as easy as it may seem. There is a lot of information out there about energy savings and a lot of people touting the importance of specific measures to save energy, but how do we know whom to believe and how accurate their claims are? To effectively answer these questions, we must understand energy conservation, energy efficiency, and the difference in the two.

Two giant challenges facing the United States are Global Warming and Energy Security. The key to both is energy conservation. Energy efficiency is the low hanging fruit. It will continue to improve and, therefore the cost of acquiring it will flatten. Energy conservation will provide the true challenges for individuals and organizations. In this newsletter, we'll explore some of the facts and myths about energy conservation and efficiency. In addition, we'll recommend specific measures to reduce operational costs on energy.

**Myth:** Efficiency equals Conservation.

**Fact:** Efficiency does not equal conservation. Energy conservation is the lowering of energy consumption by reducing energy services. For example, lowering a thermostat's setting during the heating season is an example of energy conservation because less heating is provided. However, since the ratio of energy services to energy consumption is unchanged, energy efficiency does not change. To use a lighting example, replace your incandescent light bulbs with compact fluorescent light bulbs (CFLs) and you increase efficiency. Turn the light out when you leave the room and you conserve energy. Do both and you reduce energy usage and costs.

**Myth:** Greater efficiency will result in less energy consumption.

**Fact:** Even with greater efficiency, demand will rise. History shows that in the U.S., even as efficiency has increased since the 70's, consumption has continued to rise. The Energy Information Agency (EIA) predicts that overall annual energy consumption in the U.S. will increase by more than 30%, rising from 100.1 quadrillion Btu in 2005 to 131.1 quadrillion Btu in 2030. (A quadrillion Btu is equal to about 172 million barrels of crude oil.)

**Myth:** A LEED building is more energy efficient than a similar non-LEED building.

**Fact:** It depends. The key here is energy consumption of one building as compared to another building of similar type and size. If you design a building with 45% of wall area as windows for more daylighting, then you save on lighting, but the HVAC equipment will be larger and operate longer. Also, if you increase the outdoor air ventilation above ASHRAE 62.1 (the ventilation standard recognized by LEED), then the size of the HVAC system increases. This standard is sufficient for outdoor air and, especially with low VOC materials, is not needed for dilution. When making design decisions for a LEED accredited building, analyze every point and keep energy savings at the top of the priority list.

### **Energy Reduction Actions**

- Hire someone to perform an energy audit for your facility. This is costly but worth it.
- Recycling “waste energy” can significantly increase the energy performance of a building. Energy recovery: Combine fresh air and exhaust systems into an energy recovery unit.
- Demand Control ventilation (DVC) reduces the outside air demand based on occupancy at any given time. DVC utilizes automatic controls, CO<sub>2</sub> sensors, and actuators to modulate the fresh air based on occupancy.
- Use less glass during design. Windows and curtain walls are among the most expensive building components and they provide the worst energy performance.
- If your building is steel stud wall construction, insulate the studs on the outside for a continuous layer of insulation instead of cavity insulation. This will create a true thermal break to isolate the inside from the outside.
- Don't operate equipment or fixtures when you don't need them. Automatic control sequences can turn off air conditioning/heating equipment and lights based on your facility's occupancy schedule, enable variable frequency drives (VFDs) to ramp pumps and fans down as demand decreases, raise air handler discharge air temperature when the ambient temperature lowers, and modulate air economizer sequences.
- Lighting consumption can be reduced by using basic occupancy sensors. Lighting efficiency can be improved with use of compact fluorescent and light-emitting diode (LED) site lighting.
- Inspect the building envelope for tightness. Windows and doors should be properly caulked. Exterior wall, floor, and roof insulation should be properly installed.
- Inspect ductwork for leaks. If you have leaky ductwork, it is inefficient and should be repaired by patching holes and applying mastic at the seams, equipment connections, and grille connections.
- To increase efficiency, install energy efficient HVAC equipment and low flow water fixtures.
- Maintain the equipment you own so it will reach its expected useful life and efficiency: Develop a strict and recurring maintenance plan for the staff at each facility.
- Renewable resources such as solar, wind, and geothermal energy may effectively contribute to reducing the fossil fuel based energy consumption. Depending on your region, it is worth exploring government incentives that offer to abate the cost of the capital investment.
- The energy savings in adaptive reuse of existing facilities should be considered. While these savings do not translate into a direct financial advantage to the institution over the life of the building, they do save capital costs. From an environmental standpoint, the amount of CO<sub>2</sub> emitted by the cement industry is nearly 900Kg of CO<sub>2</sub> for every 1,000Kg of cement produced.

Finally, energy usage is measured in BTUs and kW. These are specific scientific standards that cannot be reduced. Only a reduction in the quantity of these measurements will result in

energy savings. There are no magic solutions that will change that fact. The choice becomes how and when to cut it off. As spring approaches, give yourself a gift: Fatten your pocketbook by reducing operating costs through reduced energy consumption.

**About the Author:** Casey R. Hester, PE, LEED AP, Mechanical Engineer and Project Manager with Gobbell Hays Partners, Inc., has over 5 years experience in engineering consulting and sales with an emphasis in health care facility HVAC design. His experience includes working in project team environments requiring coordination with architects, owners and engineers of all disciplines and successfully delivering construction documents to the client in a timely manner.

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