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Energy-Efficient: Proof Your Building

Financial executives should implement no- and low-cost energy efficiency strategies to reduce energy costs, assess and manage risks in the area of building performance as well as employ appropriate maintenance strategies.

By Larry Wash

Many organizations are feeling a level of economic pressure beyond what they've experienced for decades.

Businesses are faced with daunting capital and operating budget challenges given the current economic environment, and every industry feels the effects of rising or fluctuating costs for commodities such as fuel, services, material and employee expenses.

"As energy cost and consumption rise and corporate sustainability initiatives become more mainstream, management teams and boards of directors have become more interested in energy management," says Corbin Baumel, executive vice president and chief financial officer of LPB Energy Management, and member of Financial Executives International.

This interest, he adds, has caused an increased level of participation in building management and energy-purchasing decisions. He also says he's "seeing an increased need for Finance and Facilities Management staffs to work together because each group brings a skill set that the other needs when it comes to building and energy decisions."

Indeed, in today's recessionary market, careful asset management is the key to survival, and continued pursuit of cost savings is critical. Financial executives should implement no- and low-cost energy efficiency strategies to reduce energy costs, assess and manage risks in the area of building performance as well as employ appropriate maintenance strategies.

With this challenging environment taking its toll, organizations must do all they can to ensure their operations stay healthy. But it's also important to keep in mind that the building and the mission of a business are linked. Despite a tough economy, a strategy that focuses on building maintenance while raising the level of its performance so that it supports the business mission is so much the better.

Cutting costs without impacting occupants and stakeholders, deferring all noncritical expenses and stretching the life of building systems a little further are all strategies that contribute to the bottom line during difficult times. The top priority is to survive this downturn, but the long-term goal should be to sustain the value of an organization's building investment, or even enhance its performance to deliver cost savings, if conditions allow.

Analyze the Risk

For firms with limited resources that are forced to "make do" with their current infrastructure, there are a number of approaches they can take to garner substantial building-related savings. But they first must understand their own level of risk tolerance and the different types of risk.

The following steps will help organizations take the appropriate level of risk while defining recession-proof maintenance plans for their building assets:

1. *Understand the current state.* To gain a clear understanding of the current state of operations, the Facilities department should conduct an audit of the building's critical systems. This may already be part of existing service agreements with service providers, manufacturers or installers. A comprehensive building systems audit by a professional will indicate how well the building and systems are performing and help identify any specific areas of vulnerability or opportunities to improve performance.

2. *Assess overall risk.* The information gained in the audit, combined with knowledge of the building's uses and the occupants' needs, will help inform an assessment of what risk a system failure might pose. Various "what if" questions at this stage highlight the level of criticality. Some examples include:

- What if the air conditioning system begins to falter in August and the

Key Takeaways

Careful asset management is the key to survival. Financial executives can cut costs by deferring all noncritical expenses, but should do so in a way that sustains the value of a building and avoids budget-busting emergency repair costs. Here's how:

- Understand and prioritize areas of risk to the building and business in light of stakeholder requirements.
- Choose the maintenance approach that mitigates risk while delivering building system reliability and energy efficiency.
- Understand the cost of ownership and leverage the value of service agreements.

A knowledgeable approach to maintenance will ensure that building assets survive in the short term, maintain their value in the long term and enhance the satisfaction and productivity of the occupants for the building's lifetime.

resulting high temperature and uncontrolled humidity in a Texas pharmaceuticals plant affects production runs of medications?

- What if an aging heating system falters in a Minneapolis school in the middle of January?
- What if the dehumidification controls serving the operating suite in a Florida hospital fails and sterility standards for the operating rooms are breached?
- What if the air conditioning capacity fails to "keep up" with the cooling load on the expanded data center full of servers that hold the production data for an entire company and must be kept at a constant 68 – 70 degrees Fahrenheit?
- What if the ventilation system in a 47-story office building with 2,500 workers inside falters?

These are real scenarios and their criticality is clear. System failure is not an option in any of these instances.

3. *Prioritize risk areas.* Knowing the overall risk and the vulnerabilities of a system — as well as stakeholders' needs — will identify the locations of highest criticality and help identify and prioritize the areas of greatest

risk. Those components of the system that can cause total system failure and drive considerable unplanned expense obviously must take top priority.

4. *Analyze critical system requirements.* Consider what risks the organization can assume based on the expertise of the staff, and identify those of a highly technical nature that may need to be outsourced.

Determine those activities that will mitigate risk in the areas of greatest vulnerability to the facility and focus efforts there. Industry-leading original equipment manufacturers can provide a method and template for performing critical systems surveys and analysis.

5. *Understand stakeholder requirements.* Take the time to listen to stakeholders and understand what is specifically critical to them. What are their concerns?

Retailers in a shopping mall want their customers to enjoy a cool, comfortable environment so they will continue to shop. Lessees renting office space want a comfortable environment with high indoor air quality. It behooves landlords to keep rent-paying tenants happy, and employers to maintain an environment that facilitates optimum productivity.

6. *Identify solutions for specific situations.* Now is the time to figure out how to ensure that the boiler doesn't fail at a bad time, or the air conditioning system doesn't begin to falter during peak cooling. An initial audit of critical systems will highlight any possible upcoming issues or physical vulnerabilities with any building systems.

Understand the Risk

It's important to understand not only how much risk the organization can tolerate, but also the types of risk it may face. For example, design risks include capacity, redundancy, controls sequencing and zoning.

Warranty risks include failure to understand purchased warranty, coverage, and implications. And budget risks involve cost of energy, staff uncertainties, resource allocation, environmental and safety implications, as well as long-term implications. Understanding these categories will help focus solutions appropriately.

Organizations that have a limited budget and must choose between making one of several repairs should focus on the components that could cause the most secondary damage if they break; then determine what level and type of maintenance plan is best.

Four Maintenance Approaches

In addition to reactive maintenance, which means "run to fail," there are preventive, predictive and reliability centered approaches to building maintenance.

Reactive maintenance means not spending money or work hours to keep the equipment running until it fails. Though this may seem like the cheapest approach, in reality, it is actually the *most* expensive.

When factoring in the increased cost driven by unplanned downtime, increased labor cost (especially if overtime is required) the cost of repair or replacement equipment — and possible secondary equipment or process damage from equipment failure — the cost is considerably more.

The costs to operate in a reactive maintenance mode are about \$18 per horsepower (HP) per year, according to "Case Study Comparison of Four Maintenance Programs," (Piotrowski, J., *Pro-Active Maintenance for Pumps*, February 2001, *Pump-Zone.com*). Using the same methodology, preventive maintenance costs about \$13 HP per year; predictive maintenance costs about \$9 HP per year; and reliability centered maintenance costs only about \$6 HP per year.

Thus, a reliability centered program can reduce a firm's annual costs between 28 percent to 66 percent.

The Federal Energy Management Program offers the *Operations & Maintenance Best Practices Guide to Achieving Operational Efficiency* that

provides an analysis of the different types of maintenance and their costs at ww1.eere.energy.gov/femp/pdfs/omguide_complete.pdf.

Quantifying the Value of Service Agreements

There are four primary cost components for a building's heating, ventilation and air-conditioning system over its lifecycle.

1. Capital costs prevent premature component replacement.
2. Energy costs manage energy commodity, output and efficiency.
3. Repair/failure costs minimize failure through pre-emptive service intervention.
4. Cost of services include preventive maintenance, testing, monitoring and parts.

The cost of services can be negated by cost avoidance of the first three cost components: capital, energy and repair/failure costs. Financial executives can then calculate the benefits of service agreements and simple (nondiscounted) life-cycle costs of building components.

Risks of Deferring Maintenance

As a business considers its strategy for managing building assets through tight financial times, it's important to consider what it means to defer all maintenance on building systems and the reasons that is not a viable option.

Delaying maintenance:

- Increases the risk of unplanned breakdowns and the resulting steep emergency service expenditures.
- Increases the likelihood of making tenants and occupants uncomfortable when building systems falter. In the commercial real estate sector, when unhappy tenants move out it typically takes approximately 18 months to establish new tenants.
- Increases the risk of having an unsafe and unhealthy environment. Good indoor air quality helps avoid sick time and potential employer liability, according to the U.S. Environmental Protection Agency. And it increases productivity by up to 15 percent, according to the U.S. Green Buildings Council.
- Degrades the efficiency of building systems, which increases energy usage and costs over time. Because energy is the single largest operating

expense in most nonmanufacturing buildings and can be up to 65 percent of an organization's total operating budget, any costs avoided through energy efficiency measures can be significant.

- Decreases the lifespan of equipment so, in the long-run, companies don't get the full return on their initial investment.

It's clear that deferring maintenance is not advisable, but times like these require some measures be taken to ensure building assets survive in the short term so they can maintain their value, and even further the mission of the business in the long term.

True, the current economic climate may be daunting to some, but that shouldn't keep anyone from appropriately managing any possible risk to their business or their assets.

LARRY WASH (lwash@trane.com) is president of Trane Global Services, in Piscataway, N.J., Trane is a business of Ingersoll Rand.