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Blowing Hot and Cold

Your buildings' heating and cooling systems are critical and need to be protected by regular maintenance programs

Your school buildings, along with what's inside them, are district assets. Most districts have maintenance programs to protect those assets.

But what about your building's heating, ventilation, and cooling (HVAC) systems? Are they protected by your maintenance programs? HVAC systems are mostly invisible, of course, but everyone notices when they stop working. A facility that is comfortable in terms of temperature, humidity, air quality, noise level, and energy consumption plays a critical role in the ability of teachers and students to focus on instruction and learning.

We believe that using an asset management strategy with your HVAC systems can protect those heating and cooling systems and save money in the long run.

In 2005, U.S. school districts spent almost $3.9 billion on maintenance projects. HVAC upgrades accounted for more than 44 percent of all the elementary school projects and some 35 percent of all high school overhauls, according to a 2006 public trade report.

HVAC upgrades, which likely will remain in place for 20 to 25 years or more, are capital investments made within a district's fixed asset management program.

For these reasons, districts should undertake a more strategic, asset management focus to new HVAC investments.

The following are some points to consider.

Use a 'life cycle cost' analysis

Traditionally, bids for HVAC upgrades are solicited on a first-cost basis. In these cases, the requests for proposals (RFPs) ask vendors to present their lowest possible pricing for the initial acquisition of their recommended equipment. Using a first-cost basis to determine the bid outcome on the purchase of supplies or commodities is fine and acceptable.

But a major HVAC project is a capital asset. The installation likely will see two or more decades of service, it represents a substantial investment of district funds, and the up-front cost of HVAC components represents only 5 percent of the overall investment in terms of the total cost of ownership over those 20 or more years.

Rather than base the bid process on a first-cost RFP, you should consider a more strategic and long-term asset management-based alternative: an RFP requiring each bid to include a life cycle cost (LCC) analysis.

The LCC cost of an asset is "the total discounted dollar cost of owning, operating, maintaining, and disposing of a building or a building system" over a period of time, according to *The National Institute of Standards and Technology Handbook*. An LCC analysis examines a capital project's total costs of ownership by comparing initial, maintenance, repair, and operating costs over the life of the system.

Bid processes incorporating an LCC analysis help districts determine the best value for their dollars among the alternatives. Factors to include within an LCC analysis are:

- Utilities
- Energy consumption and demand
- Installation and commissioning
- Long-term reliability
- Annual maintenance, repair, operations (cost, frequency, preventive maintenance, etc.)
- Service calls and parts
- Environment factors such as acoustics and indoor air quality
- System controls integration and flexibility
- Modernization and necessary system upgrades
- Financing costs

Simplify by standardizing

With 119,000 public and private elementary and secondary schools throughout the U.S., it's a good bet to say that, like snowflakes, no two are alike.

Schools' buildings represent a variety of construction techniques, designs, technology, and original use—even within the same district. Likewise, each building's environmental system is often as varied as the individual facility itself. Across a district, all that variety can create a challenge in terms of asset management.

The solution, as Henry David Thoreau would argue, is "Simplify."

Large corporations often centralize the management of key assets, such as information technology systems, with a single platform or vendor. The benefits include simplification in terms of management, maintenance, upgrades, and security—

as well as great advantages in cost control.

Districts can likewise standardize HVAC systems to reduce the inefficiencies of managing multiple systems, components, and technologies from a variety of vendors. Doing so will immediately reduce process costs. Grainger Industrial Supply studies have shown that as much as 40 percent of the cost of items is associated with process costs. Examples include multiple purchase orders, the duplication of inventory, and redundancy among vendors.

Consolidating vendors also could reduce labor costs. District maintenance and operating personnel no longer need to manage and master a variety of systems from a variety of vendors. Instead, they can gain deeper expertise with one manufacturer. Districts also can reduce or eliminate staff labor resources entirely by reassigning maintenance responsibilities to their single vendor.

Districts can leverage future centralized purchases and their long-term relationship with a single vendor to win larger pre-purchase vendor discounts.

While undertaking a districtwide consolidation effort overnight would be unrealistic, districts can implement a single vendor strategy on a rolling basis, project by project, over a number of years.

Optimize for high performance

The average school building is about 42 years old. In fact, more than 75 percent of America's schools were built before 1970, according to the U.S. Environmental Protection Agency.

As discussed, properly designed and maintained HVAC and control systems can improve a school's learning environment while saving energy, resources, and money.

Upgrading current buildings to meet new high-performance standards enhance both student and teacher performance and make education more enjoyable and rewarding.

In most districts, utilities are the second-largest budget item after personnel-related items, according to the U.S. Department of Energy. In fact, about 25 percent of the energy used in a typical school is wasted because of inefficient building systems and operations. Upgrading HVAC systems are one of the easiest ways for districts to increase building energy efficiency and reduce costs.

The implementation of new HVAC technologies provides additional benefits. Web-based building automation systems manage daily operations like reporting on the status of buildings, systems, and equipment; data collection and analysis; and troubleshooting and alarm management. They also provide a view of energy use patterns in multiple schools, enabling better decision-making, increasing performance, and easing integration.

Leverage low-cost financing

In many states, low-cost financing for energy upgrades is available to school districts through the use of what's known as guaranteed energy-savings contracts.

Districts use the contracts—sometimes also called performance contracts—to collaborate with energy service companies (ESCOs) to plan the financing, development, and implementation of energy-saving equipment upgrades and the installation of renewable-energy technologies.

Each contract is designed to meet the energy-savings goals and contractual needs of a specific facility. Depending on specific state law, projects financed through performance contracting may include energy-efficient lighting, renewable energy, HVAC systems, and even water conservation projects.

These contracts allow school districts to undertake building improvements with little or no front-end costs because the ESCO guarantees the resulting energy cost reductions. Those energy cost savings then provide the funding to pay the ESCO, which receives payment over a specified period as determined by state law—often 10, 15, or 20 years.

In addition, some utilities will reimburse or provide rebates to schools for their investment in energy-efficient equipment.

Shelby Schools improve air quality

At Shelby Public Schools, 70 miles north of Grand Rapids, Mich., school officials started a capital improvement project to improve the comfort, security, and indoor air quality in the district's buildings.

The district installed a building automation system and digital controls in an effort to:

- Increase fresh air ventilation
- Improve building temperature and scheduling control
- Reduce utility bills through energy conservation
- Reduce operating and maintenance costs while helping maintenance staff become more productive

According to Superintendent Dana McGrew, the air is cleaner, the environment is fresher, and overall there is less illness since the new system was installed. In fact, McGrew states that "the new controls and mechanical systems are saving us money." Shelby Public Schools' buildings are heating more air, but the boilers are running less, thanks to the system's energy-saving features.

Value asset management

The educational and cultural benefits of school buildings to a community are readily apparent. Districts using asset management strategies when undertaking environmental system upgrades are being proactive in their efforts to enhance the value of their school buildings—as learning environments for their students and teachers, as well as important and lasting assets to their communities. ■

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