

All Systems Go

Choosing High-Tech Building Equipment Requires Big-Picture View

By Paul Rosta

Given the ups and downs of the economic recovery, what next year holds in store for the commercial real estate industry remains an open question. But to David Gottfried, CEO of the U.S. Regenerative Network Inc. and founder of the U.S. Green Building Council, 2012 already looks like a banner year in at least one category: new window technology.

At its \$130 million factory in Olive Branch, Miss., Soladigm expects to kick off full-scale production of a new line of dual-pane windows that uses sensors to adjust the window's light and darkness quotient to sunlight and outside temperatures. Pythagoras Solar, an Israeli firm, plans the U.S. rollout of a new model that comes equipped with a photovoltaic panel. A third innovative product scheduled for introduction in 2012 will provide insulation at a level that is several times the industry standard.

From windows to water fixtures, chillers to elevators, technology has provided the opportunity to make buildings more energy efficient, resulting in remarkable advances in building system upgrades and a steady stream of new products. End users' rising expectations for cost savings, efficiency and improved working climates often make upgrades essential to keeping properties competitive.

Yet another factor that will figure into building technology investment strategies during the next few years is a steady stream of new government regulations for energy use. Industry professionals and government officials are watching the effect of regulations like New York City's performance standards for commercial buildings at least 50,000 square feet in size. Enacted in 2009, the new laws set energy efficiency standards for renovated properties, require lighting upgrades and mandate energy audits at least every 10 years.

No shortage of resources are at hand to



Sophisticated technology extends to all categories of major building systems, like the dual-pane windows Soladigm has slated for full-scale production in 2012. Sensors enable the amount of light admitted to vary according to weather conditions, and the manufacturer claims the product can reduce HVAC energy consumption by 25 percent.

help inform choices about new products and systems, including guidelines from the U.S. Environmental Protection Agency, the U.S. Green Building Council and professional organizations like the American Society of Heating, Refrigeration and Air-Conditioning Engineers.

Nevertheless, deciding when and how to make the best use of the new technology presents its own challenges. To a great extent, decisions about investing in new building technologies hinge on owner strategy. Whether chillers have reached the end of their useful lives, for example, and should be replaced depends on the owner's plans for bringing the property to market immediately or holding it for another three years.

All of a Piece

Investors and their clients are eager to reap the cost savings afforded by new technology, but making the leap still calls for a “show-

me” attitude. Hundreds of products come to market annually, ranging in quality from excellent to so-so or worse. “In our industry, there are very few of us who like to risk our clients' money on unproven technologies,” said Joe Markling, managing director in CB Richard Ellis Group Inc.'s strategic accounts group. Further complicating matters, building systems in the Digital Age are all of a piece. “These systems are not independent from one another,” Markling added. “You can't talk about a chiller without talking to the people who do the controls.”

The interaction of the various building systems has far-reaching implications for the selection of new technology. Improving efficiency in one kind of equipment can promote the use of more efficient systems elsewhere. A case in point: the relationship between using more efficient lighting fixtures and computers and less powerful air conditioning. “We don't have the same heat loads, so mechanical systems can start

[Technology]

getting smaller,” noted Mark McDowell, vice president of development at the Alter Group.

New tools for monitoring the energy efficiency of the entire building continue to emerge. Dashboards will be increasingly valuable tools for developers and others in making guarantees about energy savings generated by retrofitting, McDowell added.

New offerings in this area include Osprey-FMS, a dashboard unveiled in May by Quest Controls Inc. Besides conventional energy dashboard functions like programming and monitoring energy consumption, the new product also uses data about utility costs, weather and maintenance to identify the costs generated by different pieces of equipment.

How best to time the evaluation of building systems varies, depending on their components. A generation ago, big-ticket items like elevators or chillers were associated with a defined useful life. Manufacturers may still tout the idea of longevity, but advances in technology are beginning to blur familiar lines.

“I don’t think ‘useful life’ really matters very much anymore,” said David Pospisil, manager of the commercial and industrial energy efficiency program for utility Con Edison, which serves New York City and neighboring Westchester County, N.Y. New lighting products emerge so frequently that some experts recommend reviewing system performance annually. For heating and cooling products, the technology is evolving so rapidly that the old notion of hanging on to a new purchase for 25 years no longer necessarily applies.

Homework Time

Making the most of advancements in building system technology also calls for regular assessments of a property’s energy use. Some experts suggest commissioning an energy audit at least every three years. Besides that rule of thumb, though, a broad look at the building’s usage is also advisable when owners are eyeing a major investment.

The extent of the analysis ranges widely by the building’s size and sophistication. For smaller buildings with relatively uncomplicated systems, a thorough walk-through by the consultant can yield plenty of recommendations

for saving energy. For larger buildings that have heavy energy use and sophisticated systems, an assessment also calls for further measures, such as a study of the property’s historic energy use patterns and how that performance stacks up against comparable properties in the same general climate.

An audit may point to low-hanging fruit that will influence the selection of a leaner, lower-cost system. Since lighting is not only a major energy user but a notorious heat source, the energy auditor may recommend replacing existing fixtures. Fluorescent lighting fixtures now need around half a watt per square foot

“The cost of waiting forever for the next, better technology is huge.”

—David Pospisil,
Con Edison

served. That marks a significant drop from the 2 watts per square foot that was once typical, explained Gordon Holness, chairman emeritus of Albert Kahn Associates Inc. and a past president of ASHRAE. Addressing such issues before the shopping starts can affect equipment choices and save money. “If you do everything right, you may be able to replace the HVAC system with smaller, high-efficiency units,” Holness said.

Replacing outdated building systems with more efficient products these days typically pays off in lower energy costs. But experts argue that other potential rewards should also be factored in. Cassidy Turley recently oversaw an elevator modernization at a 140,000-square-foot office building in Washington, D.C., a project that brought in new cars, an up-to-date computer-controlled operating system and other features at a cost in the \$500,000 range, reported senior project manager David Jenkins.

The estimated payback period for the new elevators’ more efficient energy use is 10 years,

but that tells only part of the story. The upgrade has already proved enticing to one tenant that was leasing classroom space on two upper floors. The prospect of faster, more efficient elevators whisking an expanded flock of students to their classes prompted the tenant to take a third floor, Jenkins reported.

Another element that can feed into decisions about whether an investment in new technology is warranted is a regular review of systems and controls. This process of recommissioning can help determine whether the performance is meeting expectations or if systems need to be fine-tuned to meet the tenant needs. Holness, for one, recommends recommissioning at least once every three years. “We tend to think of systems as being fairly stable, but the reality is that there are a multiplicity of components, and things do go wrong,” he argued.

Among other benefits, close inspection of mechanical and electrical systems can point to the resetting of controls as an alternative to buying new systems, Holness pointed out. A 2009 study by Lawrence Berkeley National Laboratory of 643 U.S. commercial buildings encompassing some 99 million square feet suggests that recommissioning can yield considerable rewards, whether the building is brand-new or more venerable.

Recommissioning systems in existing buildings costs 30 cents per square foot but trims energy costs by 16 percent on average, the study found. For new buildings, the average cost of commissioning is somewhat higher—\$1.16 per square foot—but the median savings in energy costs is an attractive 13 percent.

Among the many moving parts that can affect strategies for investing in new building technology, the promise of what the future will hold can be both tantalizing and misleading. Some owners are inclined to put off investment in promising but pricey systems in hopes that prices will drop soon or that even better technology is just around the corner.

But consultants warn that while procrastination may save money in the short run, it also delays the start of more efficient operations. “The cost of waiting forever for the next, better technology is huge,” noted Con Edison’s Pospisil.

CPE