Energy efficiency

Synchronizing operations over a complex network of buildings

BY **CAMILLE N.Y. FINK**

Improving energy efficiency in any health care facility is a challenging endeavor. The complex systems, high levels of energy usage, 24-hour operations, and regulations and standards of care of these buildings distinguish them from other facilities.

In addition, the payback on health care projects must be fast, and facilities projects often compete for funds against other more visible, profitable priority projects, such as medical equipment acquisitions.

In multi-facility health care systems, these difficulties are compounded when the features and elements of buildings in a portfolio span a wide range.

Energy managers tasked with reducing energy consumption in these systems have to take both a broad view about long-term, systemwide energy-use goals and a more focused perspective that considers the needs, capabilities and potential of individual buildings.

Challenges and opportunities

Energy managers of multi-facility systems must grapple with various challenges inherent in overseeing large, diverse networks while also recognizing the many energy-savings opportunities that a wide range of facilities can offer.

Joshua Taylor, PE, CEM, from Jones Lang LaSalle, is the energy manager responsible for the Adventist Health portfolio of 21 hospitals and over 225 medical office buildings, clinics, physicians' offices and outpatient service centers in California, Oregon and Hawaii.

"My biggest challenges are allocating my time across many locations and understanding their needs," he says. "I deal with seven electric utilities, four natural gas companies and many water districts, so trying to take advantage of utility rebate programs is also a challenge."

For Kathleen Morlang, energy manager at Penn Medicine in Philadelphia, keeping tabs on a number of facilities requires staying focused on the big picture. "The challenge is doing things at a higher level and not getting stuck in the weeds," she says. "I don't have time to pick out the lightbulbs, for example, because I am managing 8 million square feet. I don't need to get involved in those little details."

In addition to the many types of building uses in a multi-facility system, energy managers must contend with a range of factors, including the age of infrastructure, facility designs, and different levels of staff engagement and technical training. Hospitals, in particular, are challenging because of around-the-clock operation, which results in very high energy use as well as issues related to accessing facilities and maintaining patient comfort.

But Morlang, who oversees a system that includes three large urban hospitals, says the challenges of energy management in these buildings can be reframed

Health care facilities managers as integral energy champions

Health care facilities managers are integral to effective energy management, particularly in multi-facility systems where they are most familiar with the day-to-day operations of buildings.

This detailed knowledge of their facilities means that facilities managers are in a position to push sustainability beyond just energy procurement strategies to a focus on actual reductions in energy use and carbon footprints, says Richie Stever, CHFM, CLSS-HC, director of operations and maintenance at the University of Maryland Medical Center in Baltimore.

Rick Sanchez, NBT, from Jones Lang LaSalle (JLL), is the facility manager at Adventist Health St. Helena in St. Helena, Calif., and he says his work with Joshua Taylor, PE, CEM, energy manager at JLL, is very collaborative.

"I look at where we can improve energy efficiency, and then I will propose an idea to the energy manager," Sanchez says. "If he thinks it's a worthwhile endeavor, I do the research to see if the energy savings actually pencils out."

Energy managers and facilities managers in multi-facility systems each approach energy management at different scales, which allows them to identify a variety of potential energy-efficiency strategies.

Sanchez says he spearheads smaller projects at his facility, while Taylor's big-picture perspective allows him to implement larger projects, such as solar installations throughout the Adventist Health system.

Facilities managers also play an important role in conveying information to the leadership of their organizations to ensure projects are funded and move forward.

"There's no better advocate at the C-suite level than facilities directors," Stever says. "They can identify the best recommendations, and facilities managers have rapport with their leadership and can put energy savings in terms that they understand."

Facilities managers should leverage the knowledge and skills of energy managers to foster the best energy-efficiency strategies for their organizations, says Edmund Lydon, CHFM, FASHE, senior director of facilities and support services at Beverly Hospital, a member of the Beth Israel Lahey Health system, in Beverly, Mass.

But energy management resources are widely available to help facilities managers in all types of health care systems, he says.

"There's enough of a roadmap there for any facility manager to grasp and move sustainability forward," Lydon says. "Whether you're a small critical access hospital or a medium-sized or large hospital, you should be able to adopt a program and share it with your leaders to drive it home. Really the question is, why wouldn't you?" ■

IMAGE BY GETTY IMAGES

Energy to Care helps facilities reach their sustainability goals

Many tools and resources for improving sustainability in health care facilities are available through the American Society for Health Care Engineering (ASHE) and its Energy to Care program.

Energy to Care gives health care facilities professionals access to a wealth of information about how to assess, track and reduce energy consumption in their buildings.

The new Energy to Care Sustainability Guidebook and Checklist walks facilities managers through all stages of program planning and implementation. It outlines the steps involved in creating a successful sustainability program, including the development of energy policies, sustainability plans, green teams, measurement and verification protocols, and communications strategies.

The Energy to Care Dashboard is a quick and easy tool for benchmarking, monitoring energy usage and analyzing progress over time.

"ASHE developed the Energy to Care Dashboard tool to provide an at-a-glance view of facilities' energy use," says Kara Brooks, LEED AP BD+C, sustainability program manager at ASHE. "The dashboard includes a portfolio ranking analysis view so that systems of all sizes can view their portfolio of facilities and compare their energy performance."

The program's energy conservation measures (ECMs) are how-to guides about schedule, control and repair measures that health care facilities can implement to maximize sustainability. "The ECMs outline the many ways facilities managers can easily integrate sustainability practices into their facilities," Brooks says.

Energy to Care Treasure Hunts are another feature of the program that provide significant and long-term environmental and cost-savings benefits.

ASHE coordinates the preparation, participant training and logistics of the multi-day events, which bring in skilled teams of experts to take an in-depth look at a facility. The most recent treasure hunt at the University of Maryland Medical Center in Baltimore identified more than $2 million of no-cost and low-cost energy-savings opportunities.

"The Energy to Care website is available to anyone interested in reducing energy consumption, providing value to their organization and improving patient care," Brooks says. "We encourage facilities managers in systems large and small to take advantage of these easy-to-use tools, video tutorials and detailed ECMs, compiled in one place to ensure that you get the most value out of the program."

To learn more, readers can access energytocare.org. ■

as opportunities for substantial energy-efficiency gains.

"My focus has become much more central-plants oriented because it is a 24/7 operation," she says. "Any change I make isn't just saving energy during a 12- or 18-hour period. It is saving 24 hours a day, and it has a bigger impact."

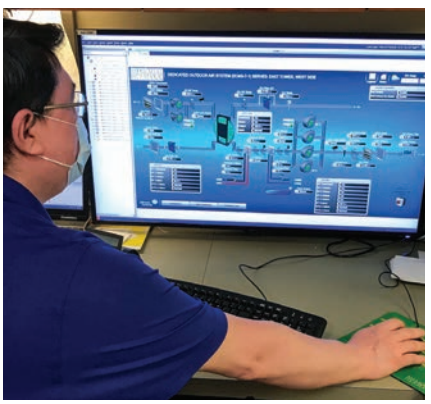
In multi-facility systems, energy managers also can take advantage of the many sites to test equipment and programs. For example, Morlang is currently trying out an additive used in chiller plants at a very small facility to see how it works. If it is successful, she can then expand its use to larger facilities, a process she has employed for other projects in the past.

The ability to do pilot projects saves time and resources, but it also is useful for energy managers during wider implementation.

"In the field, a lot of people don't want to be the first to do something," Taylor says. "Operating room setbacks is one example. So, if you have a site that already does that, then you can say, 'This location has done it, and they've had great success.' Having that in your back pocket goes a long way in rolling things out to other locations."

Assessing performance

For energy managers, benchmarking provides crucial insight into the specific energy needs, challenges and opportunities of the facilities in their portfolios, and they use a variety of tools to track and measure energy use. The Environmental Protection Agency's ENERGY STAR®



MEMORIAL HERMANN HEALTH SYSTEM

From left: Memorial Hermann Katy Hospital in Texas recently achieved the much-coveted goal of an ENERGY STAR rating of 100; a facility engineer reviewing building control graphical parameters for energy recovery of an outside air-handler unit at Memorial Hermann Katy Hospital; and Memorial Hermann Katy Hospital facility engineers (from left) Donnie Krnavek, Charles John Rebugio, Ricardo Mascardo Jr., Mike Lopez and Juan Hurtado.

IMAGES COURTESY OF MEMORIAL HERMANN HEALTH SYSTEM

ATRIUM HEALTH

From left: Atrium Health's Carolinas Medical Center in Charlotte is the flagship for a network of facilities that includes acute care hospitals, rehabilitation hospitals, medical office buildings and other facilities; and the EPA's Clark Reed (left) and Carolyn Snyder present the EPA ENERGY STAR Partner of the Year Award to Michael Roberts of Atrium Health in 2018.

Portfolio Manager and the American Society for Health Care Engineering's Energy to Care Dashboard are two effective ways to monitor and analyze energy consumption in all types of facilities (see sidebar on page 20).

"The more sites that you have oversight of that are similar in use and design, the more you have to compare," says Jedd Winkler, energy program manager at Advocate Aurora Health in Milwaukee, a system with 28 hospitals in two states and over 500 supporting sites of care. "But you have to make sure you're appropriately comparing sites. A surgery center is going to have a different baseline or average than a clinic, a hospital or a pharmacy. You need to compare apples to apples."

Hospitals are very large, complex facilities that operate 24 hours a day, and they will typically be the highest energy consumers, says Michael Roberts, PE, SASHE, CHFM, CHE, director of energy services at Atrium Health in Charlotte, N.C., which includes acute care hospitals, rehabilitation hospitals, medical office buildings and other facilities.

At the other end of the spectrum are medical office buildings, which are usually high performers since they operate limited hours and use less energy overall. However, comparing facilities in a single category may not reveal all the relevant details.

In the case of Atrium Health, the factors behind the facilities' ENERGY STAR ratings, which range from 26 to 89, are not always clear cut. "We have some facilities we would improve if we could figure out why they are not performing well," Roberts says. "It can be very difficult to understand why we have outliers." In addition, some of the system's oldest hospitals are its best performers because of knowledgeable operations staff and energy-minded facilities managers.

The ENERGY STAR ratings of Penn Medicine's hospitals, which span from 2 to 58, highlight the importance of considering the specifics of individual buildings. The system's lowest performing hospital is a much older facility made up of nine different buildings and aging infrastructure.

Still, Morlang says, the facility has great potential from an energy-savings perspective. This past year, a chiller plant optimization project at this hospital resulted in a 15% drop in cooling costs, and Morlang anticipates the facility's ENERGY STAR score will increase from 2 to 5.

And with the opening of a new Penn Medicine health care facility, a 1.5-million-square-foot building that will have a Leadership in Energy and Environmental Design (LEED) Gold certification, the range between higher- and lower-performing buildings in the system will be even wider.

ASHE RESOURCE

American Society for Health Care Engineering members can access a monograph on "Reducing Operational Costs through Energy Efficiency" by logging on to ashe.org/cost.

Changes that deliver

With data in hand, energy managers in multi-facility systems must identify and prioritize projects from the systemwide level down to individual buildings.

At Adventist Health, the focus the last two years has been a broad strategy across its hospital system: a 14-megawatt on-site renewable energy network in all of the hospitals in California and Hawaii. Taylor says that the loss of a hospital in the 2018 Camp Fire in California followed by repeated power shutdowns were also motivation to develop a self-sustaining microgrid system that will be up and running later this year.

Roberts says two initial major projects in the Atrium Health system involved reprogramming the building automation controls to be more efficient and looking at areas where the facilities were overventilated.

"When we started our energy program, our goals were that staff outside of the plant operations department wouldn't have to do anything, and they wouldn't even notice changes happened," Roberts says. "But we also educated them about what we were doing."

At the building level, adjustments at smaller facilities — such as implementing schedules and standard set-point ranges in medical office buildings — can yield

LEFT IMAGE COURTESY OF ATRIUM HEALTH; RIGHT IMAGE COURTESY OF EPA

significant savings, but these facilities do not have much room to grow in terms of energy efficiency.

Thinking about potential gains is why Morlang has focused on the major systems of Penn Medicine hospitals. Still, while hospitals can offer more energy-savings opportunities, they also require more care around implementation, and the progress from changes can get lost over time.

"It's easy to adjust machines and building control systems and improve energy performance," says Michael Hatton, RPA, SMA, FASHE, CHFM, vice president of engineering services for Memorial Hermann Health System in Houston, which includes 12 acute care hospitals and 12 million square feet of facilities. "But as soon as that team moves on to the next task, those gains can quickly erode because of lack of training and overrides and not keeping up with equipment that has failed."

In already high-performing buildings, moving the needle on sustainability outcomes is even more challenging. For example, Memorial Hermann Katy Hospital in Katy, Texas, started with an ENERGY STAR rating above 90. The facilities staff had to work hard to make the building more efficient by training staff, looking closely at energy usage and improving equipment functions, all without affecting patient comfort. In the last year, the hospital's ENERGY STAR rating moved to 100, reaching a much-coveted goal.

Winkler's approach at Advocate Aurora Health has focused on energy management and granular benchmarking processes rather than end products. "The pathway to success is setting up the culture of continuous improvement," he says. "Energy performance is the result of facility operations excellence. Develop and empower the good people around you, be vigilant, celebrate your successes regularly and get buy-in. The building control measures and everything that comes along with that will follow."

Relationships are key

Energy managers understand that maintaining relationships in a facility and throughout a system are key facets of successful programs. "The facility teams are going to know more about their locations than I ever will," Taylor says. "Build those relationships with facilities teams, and leverage that knowledge base. There are no bad ideas, and a plumber is going to see something different than an HVAC technician or a facilities manager. You never know where a good idea is going to come from."

Facilities managers are often juggling many responsibilities, including accreditation and compliance, patient safety, and maintenance and operations. As a result, other projects can overshadow energy management.

But Hatton believes that facilities managers who make energy efficiency a priority can contribute significantly to their organizations. Over the last decade, improvements at Memorial Hermann have yielded $130 million in

ADVENTIST HEALTH

From left: Part of an 800-kilowatt solar array being installed at Adventist Health Sonora that will offset approximately 20% of the hospital's annual electricity consumption; and a three-phase steam and hot-water insulation project at Adventist Health St. Helena has a combined return on investment of two years, including utility incentives.

LEFT IMAGE COURTESY OF ENGIE NORTH AMERICA; RIGHT IMAGE BY JOSHUA TAYLOR

ADVOCATE AURORA HEALTH

Aurora St. Luke's Medical Center in Milwaukee is part of a system with 28 hospitals in two states and over 500 supporting sites of care.

energy savings. "We've found the human element is a huge part of success with utilities," he says. "What you need is a facilities manager who will champion a goal and focus his or her team on it" (see sidebar on page 19).

Taylor says that, ultimately, his role as an energy manager is to support facilities managers and help them reach their energy-savings goals. "I look to them to tell me where they think we can improve, what we should do, where we should focus," he says. "I ask them, 'Is there any kind of project that you've been trying to push through on capital that will improve the infrastructure of the hospital but is also going to have energy savings?' If so, I'm there for them as a resource."

Facilities managers are also important conduits between energy managers and the leadership of organizations. "If you don't have a voice with the C-suite itself, make sure you have an advocate on your side who does have a voice," Morlang says. "I'm very lucky that I have an executive director of facilities who reports directly to the CEO, and he's a very big advocate of mine. That's the reason I'm able to get my projects done."

Connecting with leadership is essential in ensuring that projects come to fruition. But understanding how to convey information effectively is also important.

"Showing our finance team that we've reduced energy-use intensity a certain amount won't make a big impact," Roberts says. "Showing them a 20% budget reduction that is held year after year will get their attention." In addition, telling the right stories and publicizing successes build momentum, and acquiring funding for future projects will be much easier, Morlang says.

Path to efficiency

The many features of multi-facility systems can make energy management difficult, but the rewards for successful projects can be significant. Knowing which projects are the right ones for a particular system to pursue requires a deep understanding of what is often a complex and diverse portfolio of facilities.

While having a dedicated energy manager on board to help guide the process is ideal, these systems still offer useful lessons about developing energy-savings programs for networks with or without energy managers and of all sizes and capacities.

"It's amazing what you can do without having to spend a lot of capital dollars just by repairing what you have and tuning up your buildings," Hatton says. "We're fortunate to have an energy manager to help us as well, but it's a group effort by all of us. You need to have people who have the right attitude and, together, they can improve the health care facility." HFM

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IMAGE COURTESY OF ADVOCATE AURORA HEALTH