

The Next-Gen Facilities Manager in Higher Education: Tech-Savvy and Data-Driven

By Joseph Fullerton and Craig Graff

Executive summary

Higher education institutions face complex challenges, which are driving changes in facilities management. Shifting student demographics combined with aging buildings and systems, ineffective energy usage, and decreasing budgets now necessitate a smarter and more strategic approach. This paper explores this new approach and how next-generation facilities managers are using the latest technology and business intelligence solutions to create optimal learning environments while reducing costs and driving new efficiencies.

Introduction

Colleges and universities are under a lot of pressure to meet the growing demands of staff, students, and the communities they serve. In an increasingly interconnected and resource-constrained world, facilities managers must oversee a complex mix of operational needs in classrooms, labs, residence halls, cafeterias, and stadiums. And they must achieve this with diminishing budgets.

To deliver these benefits, facilities departments are now expected to be more than just a team of people that flip light switches and keep the boiler rooms running. They must perform key, interdependent functions that drive innovation on campus and contribute to bottom-line profitability. They are also now expected to help fulfill their institutions' mission and goals for sustainability and climate action. For instance, an article in the *Facilities Manager* publication states that sustainability investments can deliver positive returns to the triple bottom line of economic value, environmental improvement, and increasing social capital. And a Higher Education Facilities Manager survey¹ found that 96% of the facilities leaders in the study view energy efficiency as key to fulfilling their core mission.

Figure 1

Higher education facilities managers view energy efficiency as key to fulfilling their mission.



These new requirements are driving institutions to cultivate next-generation facilities managers who use the latest technology, building data, and business intelligence to achieve greater operational efficiencies to help them overcome pervasive and complex challenges.

Emerging trends are creating a variety of challenges

Building spaces on a campus vary in their makeup, usage, functionality, and form – perhaps more so than any others in business or industry. For example, one college campus can incorporate classrooms, dormitories, laboratories, food service facilities, office spaces, server rooms, hospital settings, and much more. Each of these buildings has widely diverse requirements for connectivity, comfort, control, and functional performance.

Managing these disparate physical environments is a challenge in itself. However, emerging trends – coupled with budget shortfalls, aging facilities, outdated core building systems, and rising energy costs – are complicating the task of error-free operations and forcing a new approach to building management.

One of the most critical emerging trends is a shifting workforce demographic, which is creating critical building-management knowledge gaps. According to Facilities

¹“Higher Education Facilities Managers 2015,” Schneider Electric

Manager, a Sloan Center on Aging and Work study found that more than 50% of facilities management personnel are expected to retire within the next 10 years.² The publication noted some schools are in danger of losing even more staff in the near future, citing a major Florida college where 75% of its facilities department will retire in two years.

As they depart, these long-time employees often take precious institutional knowledge regarding their campuses with them, such as undocumented information on renovations and updates on aging buildings. This is a concern to many institutions, as the Facilities Manager survey mentioned above points out. Eighty-six percent of the respondents in that study shared that their organization was impacted by a loss of knowledge due to a retiring workforce.

The growing amount of intelligent building data is another evolving trend that requires a new perspective on building management. Eighty percent of facilities managers in the survey reported that they have audited and metered most or all of their facilities. This is valuable data that can be used for preventive maintenance, energy efficiency initiatives, better business-level decisions, and improved budget forecasting. However, most campuses lack the right technology, tools, and people skills to fully take advantage of the power of this data, so it just sits untapped in data repositories.

One final challenge on today's campuses is the lack of integration and interconnectivity of the varied building systems. These systems – which include mechanical systems as well as information technology and communications infrastructures – are critical to running a campus efficiently. However, they can create costly inefficiencies, as well as immense frustration, when they are disparate and independent. Without fully integrated systems, critical campus functions, such as security and bandwidth delivery, will continue to be compromised.

A proactive, modern and consultative approach

Administration and facilities management teams alike are eager to identify costly and stressful facility-related issues before they arise. They would like to shorten, or ideally eliminate, reactive problem solving that comes with aging facilities and outdated systems. The evolving trends mentioned above – aging workforces, disparate systems, and large volumes of valuable data – underscore the need for a shift from a reactive facilities management approach to a proactive, bottom-line focused next-generation one.

A modern building management approach provides next-generation facilities managers with tools and skills that take advantage of building intelligence and integrated converged systems. This more effective path allows facilities managers to move quickly beyond the mechanical room and become data-driven personnel who can anticipate building needs, recognize potential problems, and apply viable tools that leverage business intelligence. And it allows facilities managers to manage dispersed mixed-use facilities through instant access to information from any location and execute real-time decisions that provide previously unrealized value.

² Sanyoit Bhusari, Brian Perez, and Bill Reese, "Bridging the Gap," *Facilities Manager*, July/August 2015

Figure 2

Modern building energy management systems integrate disparate systems across multiple buildings and provide analytical decision-driven facility data that impacts the bottom line of institutions.



With the help of sophisticated data, intelligence, analysis, and collaborative technology solutions, next-generation facilities managers can become more consultative, and more fully aligned with the strategic goals of an institution and its learning mission. They can provide building operators, administrative leaders, and C-level executives access to powerful insights that will help create cost efficiencies and build a better future for their institutions.

Data-driven and tech savvy solutions

This proactive data-driven approach requires the right combination of technology, knowledge, and services. With these in hand, next-generation managers can help their institutions develop connected, intelligent systems that are supported with a robust IT infrastructure.

The emergence of new technologies like mobility and the cloud, along with big data analytics, makes a modern approach a reality – one that can bring real business value by way of reduced energy costs, operational efficiencies, and space savings.

With one single connected system, a facilities department can now quickly engage in issues in the field while virtually monitoring systems and controlling parameters that might otherwise take hours or days to resolve.

For instance, operations personnel can test the functionality of a hot water valve and measure the effects of any adjustments on the entire heating system. At the same time, they can view the energy performance characteristics of the boiler – and do all this from a single interface that creates a comprehensive perspective from which deeply informed decisions can be made. Further, the data may indicate that the heat exchanger is adversely affecting differential pressure. From a single interface, the operator can quickly see that this is causing both comfort issues in the building as well as functional issues with the lead and lag motors back at the plant.

Intelligent, connected buildings not only help improve functionality in situations like this, but they can also serve to improve security and deliver solutions that help safety personnel monitor, control, and quickly react to security demands.

Here's a look at a few of the key tools that a next-generation facilities manager requires.

Software

One of the cornerstones for this consultative approach is onsite and cloud-based energy management software that is flexible and scalable. With open standards-based software, facilities managers can now integrate and connect diverse operational and building management systems – from tightly controlled medical facilities infrastructures to live-streaming classrooms and highly intelligent security – through a single IP backbone. Managers can then improve communications between an institution's systems, increase reliability and efficiency, and help inform maintenance and energy cost-saving opportunities. And as their institutions evolve, these managers will be equipped with a platform that will cost-effectively scale and adapt as facilities change and new technologies emerge, eliminating the need for major reconfiguration.

Hardware

From a hardware perspective, facilities managers can now utilize innovative solutions that provide all the tools needed to collect data and manage energy across an entire campus. Modern IT-enabled hardware is robust and helps facilities managers monitor, control, and analyze a comprehensive infrastructure for mechanical, electrical, security, and information and communications technology (ICT) systems. Facilities managers can also increase their capacity and expand their reach through an integrated architecture that automates processes, streamlines operations, and makes data accessible for intelligent analysis. The strength of compatibility, flexibility, and intelligence make this modern hardware a key application for the modern campus.

Services

To ensure an optimal return on their investments, next-generation facilities managers often rely on comprehensive services to improve reliability, productivity, comfort, and efficiency. With the right team of service consultants, facilities managers can extend their solutions and appropriately scale them to include the needs of the entire campus. Technical and energy support throughout the lifecycle of systems can help prevent operational down time, improve efficiency, and promote the best use of limited human and financial resources. Services also help address retrofitting, asset and system optimization, operations, installation, and planning requirements as they arise in the future.

Data-driven and tech savvy solutions

Joe Fullerton, a co-author of this paper, is the Energy and Sustainability Manager for San Mateo County Community College District (SMCCCD) in California. His district consists of three colleges on individual campuses that were built in the 1960s and today serve over 40,000 students annually. The district has a facilities team of nearly 120 individuals that manages more than 140 acres of grounds, over 80 buildings, and close to 1.8 million square feet of building space.

Recently, SMCCCD undertook an initiative that showcases how an innovative next-generation approach to facilities management can benefit a higher education institution. Below, Fullerton shares how leveraging technology in new ways and driving business intelligence with data helps ensure a safe, effective, and inspiring physical environment that supports and enhances the instructional mission of his three-college district.

Like many institutions, SMCCCD faced a myriad of facilities-related challenges, including an aging infrastructure, shifting workforce demographics, disconnected and disparate systems, and evolving pedagogical needs. Fortunately, the district's administrators embrace technological advances and set high standards of performance and care for its campuses and students.

Figure 3

College Center Building 10 on SMCCCD campus is a 4-story, 140,000 sq. ft. LEED Gold building. A flagship building that provides multiple important functions on the campus from lecture halls to student services to administrative functions.



For example, in 2002, SMCCCD engaged with an energy service company to perform over \$20 million of energy and control improvements. The improvements included digital controls and a basic energy management system through two major capital improvement programs. As part of these efforts, the district added several LEED buildings to its square footage, which helped keep energy efficiency, management, and generation initiatives as key priorities. Throughout the construction and renovation process, many different consultants and contractors worked on building control and monitoring systems.

In 2013, the facilities team began to recognize new mounting challenges that resulted from the complexity and interaction of the multitude of installed systems. These issues were threatening the tradition of excellence upon which the facilities team was built. For instance, there were inconsistent alarming functions, naming

conventions varied greatly, and system monitoring had become highly complicated for all but the most experienced engineers. To help address these challenges, SMCCCD decided to upgrade to what soon became an obsolete building management system (based on R2 technology).

Meanwhile, the energy information system infrastructure and software interface implemented in 2002 had also become outdated and defunct. Software licenses had expired, meter accuracy was questionable, and large data gaps rendered the system useless for most purposes. The lack of reliability of the energy management system left the facilities team with only three meters (one each for gas, water, and electricity) per campus. This made managing utility consumption on hundreds of thousands of square feet of building space difficult.

By 2014, the need for a comprehensive fix to address all the facilities challenges was never more apparent. The commercial availability of advanced systems that could address the functional issues throughout the campuses made a comprehensive approach viable. Fullerton worked with industry consultants to develop a request for qualifications (RFQ) and a request for proposal (RFP). This approach combined the complex needs of the district into one integrated information platform and added an advanced system for building analytics. Fullerton worked with utility representatives to ensure that SMCCCD could capture incentives to offset a portion of the project in the future.

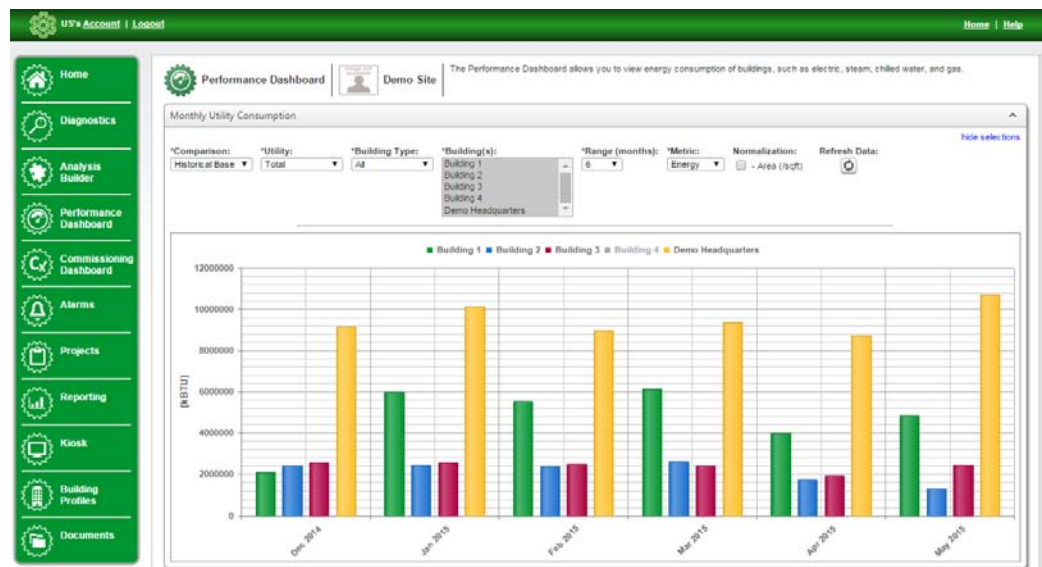
After consulting with other managers throughout the campus, Fullerton and his team developed an extensive list of building management, energy information, and building applications requirements. The parameters of the common and interconnected facilities management system proposal included these objectives:

- Provide a robust and comprehensive facilities management system that included building management, energy monitoring and building analytics.
- Help meet and improve upon the district's high standards for facilities management and energy performance.
- Build a system that could scale and would enhance the learning environment.
- Reduce the reactive maintenance cycle of facilities operations and shift to a more proactive model.

After a very competitive process, SMCCCD selected Schneider Electric to provide a comprehensive solution with project management expertise and advanced technical solutions that included StruxureWare Building Operation, Power Monitoring Expert, and Building Analytics. With this solution, the SMCCCD facilities team anticipates that it will be able to more effectively and efficiently manage their physical assets, human resources, and ultimately, help each campus achieve its educational mission.

Figure 4

SmartStruxure Building Energy Management System data provides analytics across the SMCCCD campus to uncover issues before they become problems. The staff can make proactive smart decisions about how to maintain systems rather than repair damages after the fact.



Prior to the full completion of the project, the SMCCCD facilities staff is already seeing the advantages of the new system. For instance, the team at Cañada College is taking advantage of more intuitive analytics tools, more reliable data, and cleaner, web-based graphic user interfaces.

When the solution is fully in place, the SMCCCD facilities team can better measure and manage energy and water use. With continuously monitored energy loads, they expect to save at least 20% on consumption, and much more on total cost.

In addition to the potential energy and water savings, the new facilities management system will enable the SMCCCD team to trend and log system functions and operating hours. The staff will also be able to see issues before they become problems and make smart decisions about how to maintain systems rather than repair damages. Other planning, maintenance, and operations teams at SMCCCD intend to use data from this solution to drive smarter business decisions as well. Integration into work order and asset management systems is already underway.

With the help of Schneider Electric and the facilities management system, the staff at SMCCCD can focus on its primary goal of delivering high quality, accessible education to the San Mateo County community.

Conclusion

Facilities managers can no longer play a reactive role in building management. They must become proactive and data-driven next-generation manager so they can create optimal learning environments and contribute to their institution's financial goals and strategic mission.

Now, with new innovative technology and building intelligence, facilities managers can make informed decisions that save money as they lessen their campuses' impact on the environment, and improve the education delivery of their campuses.

About the authors

Joseph Fullerton is the Energy and Sustainability Manager at the San Mateo County Community College District (SMCCCD). He manages a range of programs and projects concentrated on helping SMCCCD drive enterprise goals, mitigate risks, and communicate value. He is an active APPA member and involved with the Community College Engagement Group and Mentor Task Force. He is also Vice President of Bay APPA and co-chair of the Emerging Professionals group. Joe has a Bachelor of Science degree in Sustainable Enterprise Management from the University of Phoenix, holds a number of applicable professional certifications, and is a candidate in Arizona State University's Executive Master of Sustainability Program.

Craig Graff is the Education Marketing Segment Manager for Schneider Electric. He focuses on understanding the energy and operational challenges and needs that educational facilities face today so Schneider Electric can provide the best tools to address them and better position these facilities for the future. He has been with Schneider Electric since 2003 and has held sales, marketing, and operational positions throughout his career. He is an active member of APPA and holds a Bachelor's degree in business from Middle Tennessee State University.