



Power Management Systems - Part 2

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Life Is On



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TECHNOLOGY GAINS OFFER NEW CHOICES

Advances in technology are adding new capabilities to a range of building systems, offering benefits ranging from greater flexibility to the availability of vastly more data and an increasingly sophisticated ability to analyze that data. Those same trends are offering new power management system options for facility executives.

Consider one of the most important areas of technology development: Building Internet of Things (IoT). “Building IoT provides data from many sensors,” says Julian. “This permits more input to the power management system enabling more monitoring of individual loads.”

Facility executives get granular data that they can mine to improve operations. “You can take that detail and layer it over time to find normal and abnormal patterns in energy use,” Hammer says. “Once we understand these patterns and what is happening, we can achieve deeper energy savings.”

From a medical center’s perspective, Roberts of Froedtert Health believes that “incorporating Building Internet of Things devices into power management systems allows for safe access to data as well as improved resolution time through sharing of said data. Multiple parties can access and understand issues by receiving critical information quickly. Subsequently, issues can be resolved with reduced impact to end users.”

The ASCO/BOM survey shows that many facility executives are open to the use of sensors and other IoT devices. Thirty five percent agreed that they are comfortable with the use of those devices, while 52 percent want more information. (See Figure 9.)

Editor’s Note:

In 2018, Building Operating Management Magazine surveyed its readership regarding perceptions and knowledge internet-enabled of power management systems. Part 1 of this series summarized reader responses and attitudes about power management systems and their role in critical power, and can be accessed [here](#). This second and final installment explains how power management systems provide added value to building owners and operators.

Figure 9. Are you comfortable with deploying and using sensors and IoT devices in your network? R=367

Yes	35%
Need more information to decide	52%
No	13%

SAAS, REMOTE MONITORING AND CONTROL

Another important set of power management system options revolves around the use of remote monitoring and control and of the cloud. As noted earlier, the majority of respondents to the survey agreed that their operations would benefit from having greater power system monitoring and control capabilities for both emergency and non-emergency power systems. (See Figures 4 and 7.)

Many facility executives believe real-time notification and remote access capabilities are very important. Among survey respondents, 68 percent rated those capabilities 4 or 5 on a scale of 1 to 5, where 5 indicates “critically important.” (See Figure 10.)

Figure 10. On a scale of 1 to 5, where 1 is not important and 5 is critically important, how important are real-time notification and remote access capabilities? R=343

1 (Not important)	2	3	4	5 (Critically important)
6%	7%	19%	31%	37%

Nevertheless, despite the value facility executives see in those capabilities, the majority of respondents said that their systems currently don't have remote monitoring or control capabilities for emergency and non-emergency power systems. (See Figures 11 and 12.)

Figure 11. Do you have a system for doing the following for your emergency/backup power system? R=480

Remote monitoring & control	23%
Remote monitoring	22%
No system for remote monitoring or control	55%

Figure 12. Do you have a system for doing the following for your non-emergency/backup power system? R = 413

Remote monitoring & control	18%
Remote monitoring	17%
No system for remote monitoring or control	65%

The gap between interest and use is explained, at least in part, by concerns that facility executives and others in the industry have about the use of remote monitoring, as well as software-as-a-service options. The bottom line for many is that these approaches need to be carefully examined and implemented.



“Facilities executives should consult with IT team experts to be sure that software and hardware requests can be accommodated,” observes Roberts. “It may take a significant amount of time to work through validation processes, so it is important to engage key contributors as early as possible when making changes.”

Hammer says the technology requires some serious questions, such as “Who has access to that data and do they have a road map to handle data analytics? Who else needs it besides the maintenance staff? SaaS and web-based monitoring requires conversations that the company may not have had before,” Hammer explains.

Facility executives need to keep in mind power management systems security when considering SaaS and remote, web-based monitoring and control for power management systems. Mission critical facilities, for example, cannot risk the possibility of sabotage, so they may decide against SaaS or remote, web-based monitoring and control of their power management systems.

“We cannot have our power management get into the hands of the wrong person,” stresses Nicholas. “Due to security risk issues and potential, we need a secure network with limited access to security-cleared employees. In fact, access is logged and tracked to meet electric utility code requirements and power industry standards.”

“In mission critical facilities, we recommend onsite software within the building rather than across the Internet to reduce that point of failure,” explains Speenburgh.

The prevalence of hacking is one reason Julian cites for keeping power management systems in large critical facilities such as data centers, large hospitals, and financial institutions onsite as often as possible. “Also, what happens if the Internet goes down?” Julian asks. “Then you potentially have no service.”

For smaller facilities that cannot afford the technical staff or cost of customized power management systems, however, Speenburgh and Julian think this option makes good sense.

Mace from Putnam County Hospital agrees. “With my building management system, I can remote in, look at problems and either fix them or tell what is happening to an expert,” Mace explains. “In some cases, the contractor may be able to fix the problem without even coming out.”

For facility executives interested in remote monitoring and control or SaaS options, it’s essential to take a hard look at the system provider. Erdman stresses that the reliability of the system is very important. “As it is cloud-based and from a third party, you do not have control of it,” he says. “A more reputable company should be considered versus a start-up.”

OBSTACLES TO OVERCOME

Interviewees universally agreed that cost of power management systems is a limiting factor in their deployment. A case in point: Mace is analyzing options for expanding his hospital's power management system. But he admits finding the money can be hard. So, he works slowly with a master plan.

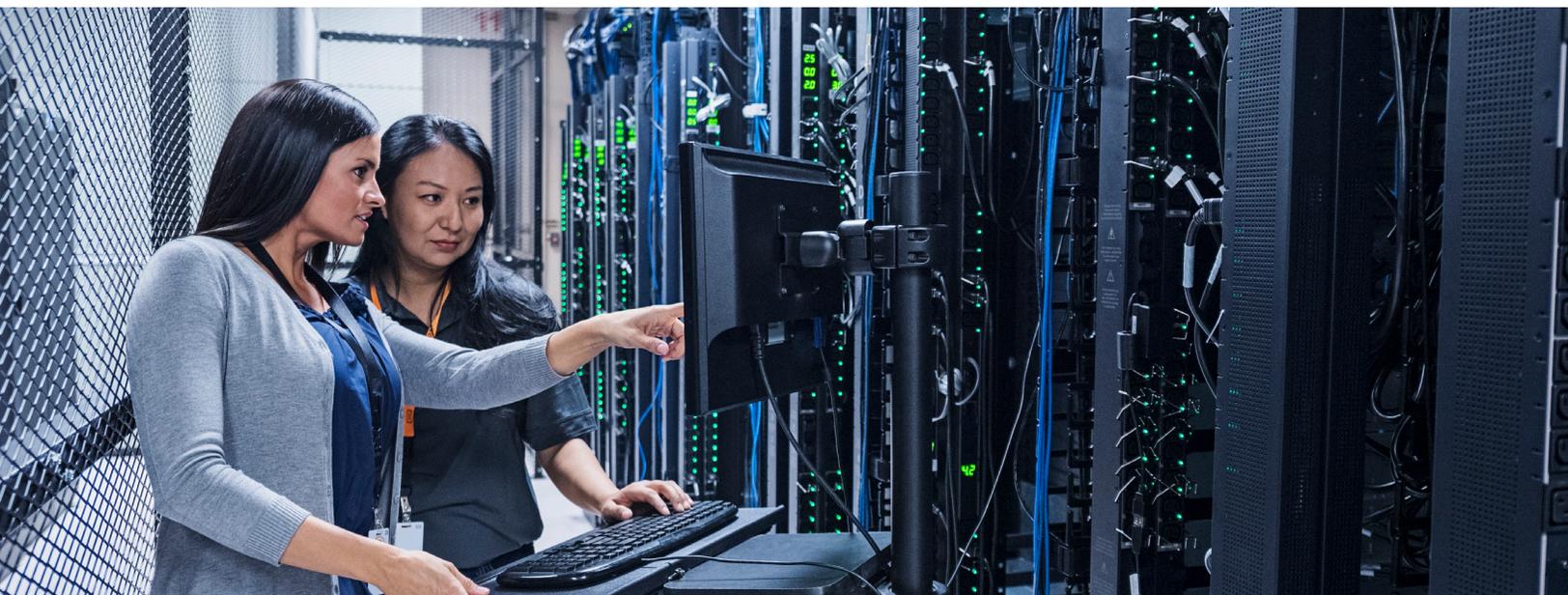
Two years ago, the hospital installed a new generator so that it could keep more critical equipment operational. And he's looking to have more backup power in future years, "so we can stay open and operational during events, not just cover life safety and critical equipment."

Abdullah agrees that cost is the main issue limiting power management system use. He overcomes this obstacle "by doing power management improvements over phases. You have to have a plan with a beginning and an endpoint when your new power management system will be fully operational."

The ASCO/BOM survey asked about obstacles to obtaining greater power system monitoring and control capabilities. By far the top concern was cost, with 79 percent of respondents identifying that as a hurdle. (See Figure 13.)

Figure 13. What are the obstacles to obtaining greater power system monitoring and control capabilities? R = 397

Cost	79%
Higher priorities for other infrastructure	49%
Lack of time to investigate options	23%
Lack of ROI	22%
Centralizing monitoring and control functions	21%
Automating operations	21%
Paralleling power sources	19%
Streamlining compliance	13%



USING ENTERPRISE IT NETWORK CAN HELP OVERCOME COST CONCERNS

Using an existing IT network for power management is a more cost-effective approach than creating an independent backbone for the power management system. “If a solid IT network exists, creating a dedicated backbone may not offer a favorable return on the investment required,” points out Roberts of Froedtert.

Today, both the facility’s IT network and dedicated backbones are commonly used options for power management systems, according to the ASCO/BOM survey. (See Figure 14.)

Figure 14. Do your power management systems run on your facility’s IT network or on its own dedicated independent backbones? R= 245	
IT Network	40%
Independent backbone	30%
Both	30%

Roberts cites advantages to the use of the IT network. “IT teams are familiar with their typical networks.” This knowledge base helps reduce the amount of time it takes to fix breakdowns in software and hardware systems.

“Concerns with this approach can often be addressed by recognizing risk exposures and mitigating them,” says Roberts. For example, Roberts suggests using loop configurations in communications systems to avoid single points of failure that could disrupt operations.

An existing IT network also offers the advantage of miles and miles of prewired structured cabling, running from strategically placed closets back to the main data room. Generally, many more structured cables are installed during initial construction than are actually needed, as installation at that point is relatively inexpensive. Also, it makes moves and changes to spaces inside the building easier to accommodate. Network equipment could be shared but total workload and network latency (time to poll each item for status) need to be minimized for fast response.

“Using the same cabling and closets for the power management system actually can be good asset management,” notes Julian of Integrated Design Group.

Another reason to operate on two networks, according to Erdman of Zeller Realty Group, is redundancy.

Despite the advantage of using the IT network, some mission critical facilities may be leery of using a network with Internet access for the power management system. Asked whether they would prefer to use the IT network or a dedicated network, respondents to the ASCO/BOM survey were divided almost exactly in half. (See Figure 15.) Seventy two percent of respondents said that security concerns would determine whether to use the IT network or a dedicated network for power management. (See Figure 16.)

Figure 15. Ideally, would you like your critical power management system to run on the IT network or on its own dedicated, independent backbone? R=227	
IT Network	51%
Independent backbone	49%

Figure 16. Would security concerns drive selection of existing vs. dedicated network? R=384	
Yes	72%
No	28%

Facility executives report that there are ways to overcome obstacles other than cost. Consider concerns that a power management system may be too complex. “Perception of complexity can often be reduced by educating end users and installers,” says Roberts. “When people become comfortable with power management systems, they realize efficiency gains.

Planning and facilities and IT staff training are very important to successfully implement power management systems, according to Hammer. “Processes may look very different on the new system,” Hammer explains. “Training needs to be in place so that the new power management system can actually work as designed.”

Another issue to be addressed is concern about continuity in the event of failures. This obstacle can be overcome by “risk assessment and migration,” Roberts says. “For example, software and hardware redundancy to eliminate single points of failure can be created in well-designed systems.” He also suggests that power management systems incorporate manual operation options so that if automated systems fail, the facility’s power from backup generators can be activated.

CONVERGENCE OF EMERGENCY AND NON-EMERGENCY POWER MANAGEMENT SYSTEMS

Historically, emergency and day-to-day power have been managed separately. But today that is beginning to change, as management of the two systems starts to converge under a single power management system. Such a move is logical, given that the two systems share the same infrastructure and that power management capabilities benefit both the emergency and non-emergency sides of the power system.

“The advantage is seeing everything from a single pane of glass,” Hammer explains. “When data is structured by what is an emergency and what is non-emergency, the power management system can execute the facilities priorities, without requiring two separate systems. Once learned, that single pane of glass is much easier to operate as compared to having one power management system for emergency backup power and a second one for non-emergency energy management.”

“The advantage of convergence is that generator plant assets can be used nearly all the time, provided there’s not an emergency,” says Zwebach. This means facility executives can take advantage of utility demand-response and other programs that return money to the organization. And using generators that frequently sat idle helps ensure they will actually perform in an emergency.

“The advantage of a single power management system is there’s just one system to learn,” observes Julian. “From an operational standpoint, having access to both emergency and nonemergency loads is an advantage.”

Erdman believes converging into a single power management system for both emergency and non-emergency power would result in “less up-front cost.” However, he is “not seeing this in the Class A office sector at this time.”

Although the need to justify capital expenditures will delay full implementation, Roberts believes convergence of power management systems is beginning.

The benefits of convergence are significant. Merged software systems allow data to be accessible when and where needed, which may allow facility executives to catch problems in systems as they begin to malfunction. “When issues are discovered early, scheduled proactive approaches with planned financing can be used,” notes Roberts. “In addition, compliance is easy to demonstrate to inspection groups.”



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