



Facility Engineer Finds Novel Use, Extra Value from Power Management System



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When Mike Krone considered a Square D® PowerLogic® power management system, he did so based on more beneficial features and fewer hidden costs. Once the system was installed he discovered unexpected added value that has already saved the University of Maryland, Baltimore \$100,000 and will likely save much more.

Krone is an engineering project manager at the university. Occupying 20 blocks in downtown Baltimore, it is one of Maryland's largest users of electrical power. As the Professional Graduate School for the University of Maryland System, the campus comprises Maryland's Schools of Medicine, Law, Dentistry, Nursing, Pharmacy, and Physical Therapy, as well as the University of Maryland Medical Center.

Shortly after Krone joined the facility engineering staff, the facility manager decided to seek an intelligent electrical metering system – a more advanced system of power monitoring than the building pulse counters used by the building automation system.

Schneider Electric and another supplier responded to the university's Request for Proposal. The quotes varied only 10 percent in price, so in making his recommendation, Krone scrutinized each system for hidden costs and beneficial features.

The existing setup used a mix of electro-mechanical kWh meters with “pulse initiators” and some of the alternate vendor's new generation of intelligent meters. The meters provided kWh pulses to the local building automation system panels for collection and ultimately sub-billing to the campus users. Although the out-dated electro-mechanical meters provided too little information, they were not UMB's biggest concern. The new meters proposed by the alternate vendor were the biggest factor. They would either provide too few or too many pulses per hour to the automation panel for it to accurately provide readings. The facility engineering staff wanted more accurate, detailed energy usage information, preferably segregated by building – a sub-metering capability that would allow the university to allocate energy costs to facilities based on actual usage.

More Features, Fewer Hidden Costs

“After the RFP was completed and we installed the PowerLogic meters, we quickly realized that the PowerLogic meters could be very discrete with the kWh value per pulse, also known as pulse weighting,” Krone said. “At every location that we had a problem with in the past, the new PowerLogic meters provided just the right amount of pulses per hour for the automation panel to determine a reasonably accurate reading.”



Krone found other efficiencies as well. He said the PowerLogic system from Schneider Electric was preferable based on several findings, including the comprehensive product line. For example, at those locations or metering points where UMB wanted the meter to have on-board memory for only a day or two it would automatically have to purchase the higher-end meter from the alternate vendors. From Schneider Electric UMB could purchase a lower-end Power Meter for half or less the cost. At its utility connection points where the facility engineer wanted several months of on-board memory, an alternate vendor could not produce a device with several megabytes of memory.

“The other vendor recommended installing a computer to do the local data storage,” Krone said. “This computer would have been another weak link on the meter network that would require constant attention due to software upgrades and security patching.”

Krone also understood the value of an open system architecture. “Two of the best-selling points about the new system is its ease-of-use with a fiber optic based Ethernet network and its client-server system architecture,” he said. “We wanted to save cost by putting the PowerLogic metering system on our existing fiber optic based Ethernet network dedicated for our facility systems – building automation, access control, future fire alarm, etc.”

The alternate vendor’s system employed a proprietary protocol, that uses frequency shift keying rather than the industry standard RS485 communication. It would require solesource procurement of future devices or very expensive protocol chips from the supplier to allow communication with third party devices and systems. While that copper-based network architecture would work on the Ethernet network, it required additional modules resulting in greater cost and more potential device failures in the future. The PowerLogic client-server architecture enables the user to make a change to a table or file from any workstation on the network. Once saved to the server, that change can automatically be seen on all of the other workstations on the network.

“We also liked the fact that the PowerLogic software is developed in-house, which means no third party charges for every upgrade or for any minor screen modifications,” Krone said. “The alternate vendor’s software was third party which meant that as we realized our needs for this system and would want to make a change to the software, we would have to pay a technician to do it instead of doing it ourselves. Also, every change that would be made to a saved table or file, would have to be duplicated at all of the other workstations on the network. This would be very time consuming for us since we have seven workstations on the network.” Because the system is browser based, it is easy to use. When upgrades are needed, they will only need to be made to one device, rather than all computers. When the user changes computers, the system isn’t affected because the browser can access information from the system.

Distribution System Savings

The new power management system that UMB employed includes 30 Ethernet gateways, 51 highend power quality meters, 80 mid-range meters and several low-end meters for smaller monitored loads. Initially, the university used it primarily for four key tasks:





- Trending/archiving historical usage, for the entire campus and by building
- Pinpointing campus outages via graphic screens that display breaker status
- Verifying the monthly utility bill with the use of the PowerLogic Billing Software
- Assisting energy management by analyzing kW trends on specific circuits.

Krone discovered an altogether additional capability of the system that helps the university budget for new construction projects, of which there are many. Data from the system prevents consulting firms from overdesigning the electrical system on new projects.

“One of the greatest benefits we have realized from the PowerLogic system is for estimating building distribution system sizing for our new construction projects,” Krone said.

According to Krone, UMB’s design consultants for new building construction projects usually assume an electrical demand of 20 watts per square foot or higher to determine the substation transformer and low-voltage switchgear size. Through the charting and graphing features of the PowerLogic system, UMB can lower the demand estimates to 8 to 10 watts per square foot. “For one project of approximately 200,000 square feet, this reduced our double-ended substation size from two 4,000kVA transformers with 5,000 A switchgear busses to two 1,667kVA transformers with 3,000 A switchgear busses,” Krone said “This has happened on two other projects, which leads me to believe that the payback period for our PowerLogic system investment, based on distribution savings alone, is less than three years.”

As the new power management system was being installed, the university was preparing to build a new Health Sciences building. The consultants calculated the costs of the building’s electrical system – particularly substations – based on their usual estimate. But Krone confirmed that the consultant’s method of using connected load values was inaccurate.

Efficiency Earns Recognition

UMB’s attention to quality products, systems, and maintenance earned the university the Award for Excellence in Facilities Management presented by the APPA/Association of Higher Education Facilities Officers. It is the organization’s highest award. “This is an extremely difficult award to earn,” Krone said. “It requires a complete analysis of our organization, including energy policies, systems, strategic planning and service delivery. Besides 30 pages of entry materials, we also were subjected to an on-site inspection by a team of facilities management peers. Our new system is a very important part of our efficiency capability.”

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