Electric Submeters Help Phoenix Facility Managers Save Energy and Lower Costs

by Ken Gill

Arizona facility managers are increasingly using electric submeters to track consumption and demand as a cost-effective way to identify energy savings opportunities and lower operating costs.

Phoenix Plaza's submetering system helped facility managers realize $200,000 in annual energy savings, resulting in a submetering system payback of only five months.

The type of energy data needed by today's sophisticated facility is beyond the capability of the master utility meter, which provides a broad indication of consumption (kWh) and demand (kW), but not the level of load profiling needed by facility owners and operators to:

- Allocate energy costs to specific lease spaces, circuits or buildings;
- Profile entire facility for demand management, load shedding and energy initiative compliance;
- Aggregate energy demand/use for bulk energy contracts in deregulated markets;
- Implement demand response/control to avoid costly ratchet charges;
- Cost allocation; tenant billing, equipment performance diagnostics and more.

As first-level data gathering tools in the facility load-profiling process, submeters provide highly accurate 15- or 30-minute snapshots of energy use and demand—from the enterprise level all the way down to a specific circuit or item of equipment. Submeters are an easily installed, versatile and scalable solution for obtaining the degree of energy intelligence needed to optimize today's facility operations—no matter what type of facility needs monitoring. Following are just two examples of how Arizona buildings are using submeters to save energy, cut cost, improve facility operations and reduce pressure on the bottom line.

Commercial Office High-Rise

The electrical submetering system at Phoenix Plaza is helping building managers more accurately track and bill energy use in this 21-story twin tower office complex in midtown Phoenix. Housing 34 different tenants, a retail center and a parking garage, the submetering project was motivated by the need to more fairly bill the tenants who, before the installation, paid for energy according to a flat cost-per-square-foot rate. Tenants that exceeded their preset energy baseline caused the cost differential to be unfairly distributed to other tenants. Some computer-intensive tenants routinely exceeded their allotted energy use through extended business hours or by having more people or equipment than was recommended for the lease space.

In operation, current sensors on each floor send energy consumption data to the facility's engineering office, where it is collected and recorded by 80 submeters installed in four, eight-meter multiple meter units (MMU) and two, 25-meter MMUs. The meter data is communicated to a PC, where automatic meter reading software analyzes the data and prepares the monthly billing statements for each tenant.

"All the money we recover goes into

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Phoenix Plaza energy manager's monitoring station where data from the facility's 80 submeters are input into energy analysis software for cost allocation and tenant billing.

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a 'kitty,' operating costs go down and the other tenants benefit," said Phoenix Plaza's assistant chief engineer. "People who are using the power are paying for it now. It's not being spread equally among everybody, which is fairer to the little guy."

Phoenix Plaza's $75,000 submeter installation paid for itself in only five months. By billing tenants for their actual energy use, managers were able to reduce operating costs by about 25 cents per square foot. With about 800,000 square feet of submetered office space in the two towers, annual energy savings of about $200,000 are now freeing managers to focus their time on other areas, including capital repairs and improvements.

An interesting side benefit, energy managers have noticed that tenants are more energy conscious since the submetering began, a trend that could lead to even more savings. In light of this scenario, little wonder that Phoenix Plaza captured the BOMA Building of the Year Award in 1993, 1994, 1995, 1999 and 2000 for superior tenant services and building operation.

Multi-Tenant Residential

Esplanade Place, a 13-floor luxury condominium in the heart of the Phoenix business and financial district, provides the equivalent of four- and five-star hotel amenities to its residents. During construction, submeters were installed in all 56 residential units to monitor energy consumption on a real-time daily basis and to facilitate pro-rata energy cost allocation. However, tracking energy use in the building's common areas was a challenge, including 60 chandeliers in the hallways, two five-ton heating pumps for keeping the rooftop pool at a constant temperature and the building's two large cooling towers.

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Esplanade Place is using submeters to monitor and allocate common area costs and pro vide monthly tenant billing statements, in addition to identifying pre viously hidden energy sa vings opportunities.

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Before the Enterprise Energy Management System (EEMS) was installed, facility managers read each meter and manually entered the data into a spreadsheet — a time-consuming and inefficient process. To streamline this process, Esplanade facility managers installed CAT5 cabling to network the submeters to a central computer for easy billing management via meter reading and energy analysis software. To capture usage from the above mentioned common-area circuits, three additional submeters were installed and monitored.

In terms of other energy-saving opportunities, replacing hundreds of 60W incandescent bulbs with more energy-efficient fluorescent lights resulted in considerable costs savings throughout the building. In this way, management not only saved energy and money on lighting; but also reduced the building's air-conditioning load by eliminating the extra heat generated by the incandescent common-area lighting. By all accounts, the building's residents were unanimously impressed by the high level of service and cost savings that resulted from the energy-efficiency measures implemented at Esplanade Place.

The Bottom Line is Still the Bottom Line

An inexpensive and easily installed solution to that old energy adage, "You can't manage what you don't measure," submeters are the ideal data acquisition front end for tracking electrical consumption and demand at the enterprise level all the way down to individual circuits of interest. Phoenix Plaza and Esplanade Place are two excellent examples of state-of-the-art Arizona buildings that are submetering for energy savings and lowering operating costs — the name of the game in today's competitive, energy-focused building environment.

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