

# Sustainable Facility

## Case Study: Submetering Energy Consumption for Better Accountability

>> By **Don Millstein**

**A**etna Inc., a leading healthcare service provider, outsources responsibility for the daily operation of more than 5 million square feet of company-owned commercial property in the Northeastern U.S. to Grubb & Ellis Management Services (GEMS). As one of the few real estate management companies with a comprehensive menu of full-time in-house engineering services, GEMS provides its customers with a wide range of coverage, including demand-side energy management, identification and analysis of energy reduction opportunities, usage monitoring and analysis, and other services.

Two-thirds of the office space in Aetna's modern, multi-use facility in Windsor, Conn., is leased by a pair of high-profile IT companies, including a well-known financial services group and a large commercial printer specializing in custom mailing applications for high-volume accounts. Though similar in many ways, the unique energy patterns of these high-use tenants prompted the owner to find a way to monitor individual energy consumption to more accurately and fairly bill facility lessees.

### CONCISE ENERGY SNAPSHOTS

As project engineer for several GEMS company properties, Mark Melnick designs and implements a full spectrum of engineering projects, including monitoring and maintaining energy usage data for utility budget development and energy contract negotiations. Melnick's solution for the Windsor facility was to install a full-featured automatic meter reading (AMR) system that would provide an accurate, concise snapshot of each tenant's energy usage, in lieu of the usual cost-per-square-foot allocation used by many commercial property managers. An important requirement, scalability was seen as a definite plus should the existing tenants require additional monitoring or the remaining unoccupied third of the facility be leased to a new tenant.

After investigating alternative solutions, Melnick selected Langhorne, Pa.-based E-Mon,



■ **Increasingly, state-of-the-art commercial properties are using electric submeters for tracking and managing energy consumption, reducing operating expenses, allocating costs, and for other uses that benefit owner and tenant alike.**

LLC ([www.emon.com](http://www.emon.com)), based on the availability of East Coast-based technical support and positive feedback from other users. In a test of system accuracy, Melnick "compared the readings gathered from the E-Mon submeters to test equipment that was installed temporarily, and the readings between the two systems were very similar."

The submetering system was installed in two phases, with the commercial printer waiting on completion of the financial services company. "Each phase of the system took approximately three to four weeks to install," said Melnick, "which may seem a bit long, but all the conductors were run in-pipe and a large portion of the install was above very crowded suspended ceilings." The installation was performed by Windsor Locks-based P.J. Lodola & Sons Electrical Contractors.

### SUBMETERING THE OPERATIONAL PARAMETERS

In operation, the submetering system monitors three separate parameters—480V/3-phase elec-

trical power, both AC line and battery-backed Uninterruptible Power Supply (UPS) systems, and chilled water consumed by the facility's HVAC system. Figure 1 on page 62 shows the process by which the electrical power and chilled water input data are converted into information for analysis and tenant billing.

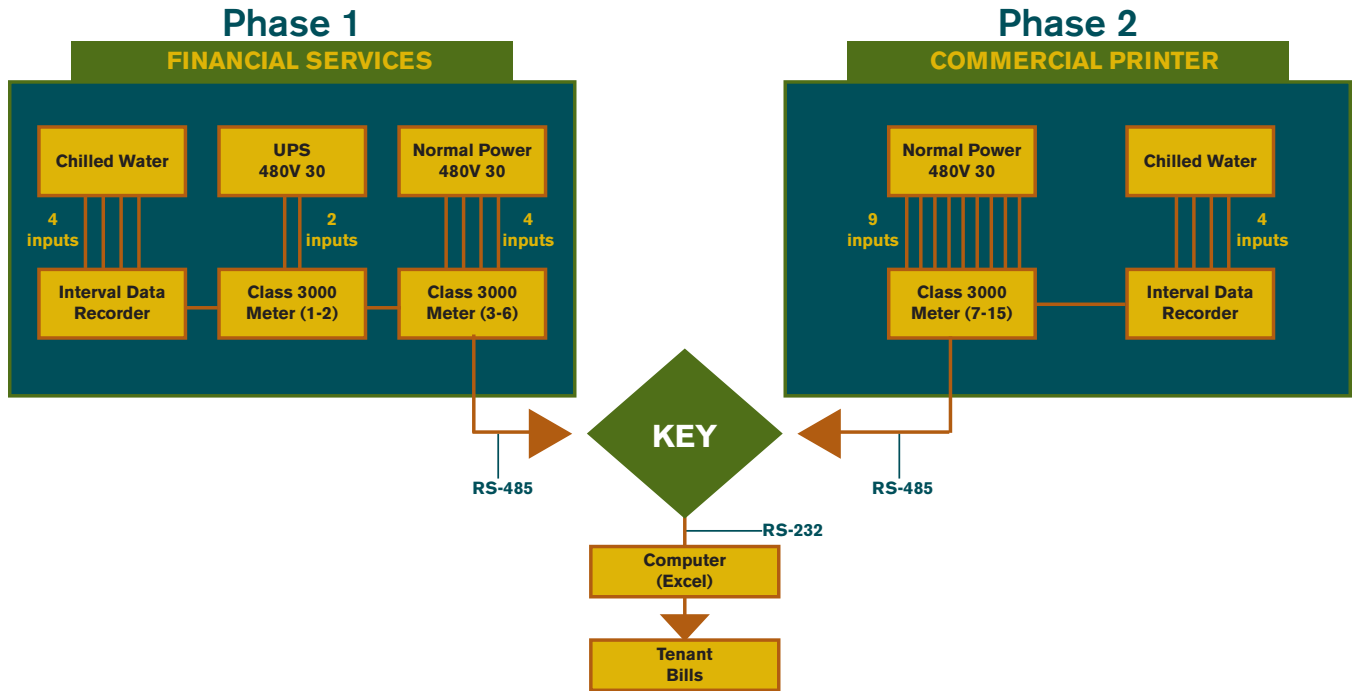
Split-core current sensors allow meter hook-up to the 480V line without powering down the load being measured, resulting in a safer, quicker install. The wiring distances between the panels and the E-Mon Class 3000 submeters vary from a few feet to several hundred feet. The meters themselves are daisy-chained via an RS-485 link that allows up to 4,000 feet total length from the farthest sensor to the central monitoring location.

The second measurement, consisting of two data points, is taken from battery-backed UPS systems. Since it's billed at a higher rate than normal power to help defray the owner's UPS maintenance costs, back-up power is tracked as a separate line item. Each UPS battery array is therefore connected to its own submeter, which sends a digital output to the lead or master meter in the chain.

The third measurement is collected by a pair of four-channel Interval Data Meters (IDR) that digitize the two-wire pulse outputs from the water chillers and send them to the lead Class 3000 submeter. This device then transmits the cumulative data from all points to a "key" device that converts it to the RS-232 format required by the host PC at the central monitoring location.

### MANIPULATING THE DATA FOR BILLING

Project engineer Melnick stops by Windsor every month to ensure that operations are running smoothly and to review the energy data and prepare the tenant monthly billing statements. E-Mon Energy AMR software lets Melnick manipulate the data in Excel and format it into customer invoices and other reports. "I would



■ Figure 1. Twenty-three data points are being monitored between the two high-energy use tenants, including 13 normal power, two UPS back-up systems and eight chilled-water units.

say that, once a few minor programming issues were resolved, the process was pretty straightforward,” Melnick said, referring to the icon-based system that simplifies and speeds the billing process.

### SUBMETER SCALABILITY BENEFITS

System expandability is an important factor in AMR, especially in the commercial property management business where tenants come and go, and lease space requirements contract and expand with the ebb and flow of the business picture. Many corporations are now opting out of building ownership altogether, choosing to lease as a strategy for relieving bottom line pressures.

Energy managers are discovering that submeter-based AMR systems can help them spend a wiser energy dollar and cut operating costs in a number of ways as a result of having more ac-

curate information at their fingertips. System expansion is also important. In the case of the Windsor property, Melnick says that, “One of key benefits of the E-Mon system is the ability to leverage existing equipment when adding additional monitoring points, either for a new tenant or additional loads with the existing tenants.”

### THE BOTTOM LINE

The project engineer’s confidence in the performance and value of his submetering system has led to recommending similar systems for other company properties. The benefits of submetering are many but, for this satisfied user, two stand out in particular. First, submeters allow building owners to determine actual tenant energy consumption that results in more fair and accurate billings. Secondly, submeters can

be used to examine load profiles, thus enabling changes in operating practices that can reduce energy consumption and preserve capital. For staunch submeter proponents like Mark Melnick, it all boils down to this one thing—“If you can’t measure it, you can’t manage it.” **SF**



*Don Millstein is president and CEO of E-Mon, LLC of Langhorne, Pa., a manufacturer of electric submetering equipment, energy management software and services. For more information, visit [www.emon.com](http://www.emon.com).*

### >> EDITOR'S NOTE <<

The Aetna property was recently acquired by a new owner.