

ENERGY

Submeters Facilitate LEED Certification for Health Care Facilities

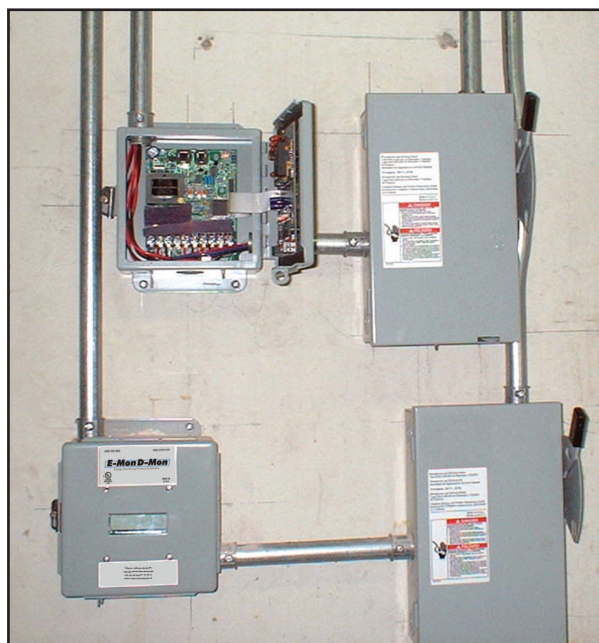
According to industry estimates, overall facility operating costs are 10% higher than just four years ago, with combined utility costs up almost 20% over the last two years alone. Interestingly, electrical usage during the latter period fell almost 13%, most likely in response to continuing rate hikes and other factors driving increased awareness and implementation of enterprise energy management systems (EEMS), equipment efficiency upgrades, utility energy initiatives and other cost-saving measures.

This trend especially impacts health care facilities which, according to the U.S. Energy Information Administration, uses 2.7 times more energy than typical office buildings. Against this, overlay the DOE's own analysis of energy use in the health care sector, in which \$5.3 billion is spent every year, second only to the food service industry in terms of energy consumption.

Because of the energy requirements associated with supporting 24/7 operations and other unique needs, hospitals and other patient-care facilities clearly face a growing challenge in managing and controlling their energy use and demand without negatively impacting the quality and cost of their services. As a tool for measuring and verifying the facility's energy footprint, submetering hardware and automatic meter reading (AMR) software systems offer an easily installed, readily available Rx for that old energy adage that says, "You can't save what you don't measure."

What are Submeters?

First introduced in the early 1980s, electric submeters continue to gain traction in the institutional facility segment as front-line energy data gathering tools that can dramatically improve the



24/7 operation and other unique needs make health care facilities ideal candidates for submetering to measure and verify compliance with energy management initiatives.

bottom line through greater visibility of the facility's total energy footprint. With increasing sophistication and functionality of building automation systems, the need arises for equally sophisticated levels of energy profiling that typically cannot be provided by the master utility billing meter at the main electrical service entrance. Alternatively, submeters—metering devices with monitoring capability—are installed on the facility side of the master meter to provide a number of advanced monitoring functions, including but not limited to:

- Analysis, measurement, verification and benchmarking of peak demand (kW) and consumption (kWh) for compliance with energy initiatives;
- Time-of-use metering of electricity,

gas, water, steam, BTUs and other energy sources;

- Load comparisons;
- Threshold alarming and notification;
- Net metering;
- Multi-site load aggregation and real-time historical monitoring of energy consumption patterns for negotiating lower energy rates.

Health Care and LEED Partnering for Green

The first facility environmental rating system was developed in the U.K. by Building Research Establishment Ltd (BRE) in 1990. Known as the BRE Environmental Assessment Method, the BREEAM rating system inspired several spin-offs, including the U.S.

Green Building Council's Leadership in Energy & Environmental Design (LEED) rating system. Since its establishment in 1993, LEED has moved into virtually every U.S. commercial and industrial building sector, and is lately being developed for use in health care and at the residential and neighborhood levels.

However, with health care facility construction projected by some industry pundits to surpass \$35 billion by 2010, only two percent of health care facilities are currently pursuing LEED certification, a number that is beginning to grow, thanks to a collaboration—now in its fifth year—between the USGBC and the Green Guide for Healthcare (GGHC). A joint project of the Center for Maximum Potential Building Systems and Health Care Without Harm, GGHC is not affiliated with the USGBC but is working closely with the latter to develop a “voluntary, self-certifying metric toolkit of best practices that designers, owners and operators can use to guide and evaluate their progress towards high-performance healing environments.” GGHC bases much of its rating framework on LEED, with permission, but also includes modifications geared specifically to the health care facility environment. Similarly, the new LEED for Healthcare guideline draws heavily on the GGHC as a foundational document in its development, which is being seen by many as a crucial milestone for bringing more health care facilities into the sustainability fold.

Role of Submeters in the Facility “Greening” Process

Submeter manufacturers have responded to the green challenge by developing next-generation hardware and software tools that specifically address the needs of the sustainability market. Certified to ANSI C12.1 & C12.16 national accuracy standards, new-generation green meters offer a number of important

features for new construction or retrofit applications, including:

- Scrolling LCD display of kilowatt (kWh) usage;
- kWh in dollars;
- Current demand load (kW);
- Cost per hour, based on current load;
- Estimated CO₂ emissions in pounds, based on DOE standards;
- Estimated hourly CO₂ emissions based on current load;
- Net metering, including utility-delivered vs. user-received power and net usage;
- Compatibility with BACnet, Modbus, Ethernet, RF and other popular building automation system communications;
- Compatibility with pulse-output utility meters, including water, gas, BTU, steam, etc.

Measurement & Verification

Submeters are particularly useful in the Measurement & Verification (M&V) role. Since they may be installed virtually anywhere, submeters are ideal for monitoring individual items of equipment or circuits of interest. For example, individual submeters can be installed at the point of load to monitor chillers, HVAC, air handlers, pumps and so forth. Operational inefficiencies may thus be identified to reveal, for example, if two or more large loads are coming on at the same time, causing demand spikes. Diagnostic functions also include the ability to identify equipment that may be close to failure, as indicated by a larger than normal current draw with no corresponding productivity output. Early identification of a potential problem allows facility engineers to schedule preventative maintenance before a costly failure occurs. Other key M&V capabilities enabled by submeters include:

- Load control options to automatically shed user-specified loads to avoid costly demand charges;
- Tracking usage of lighting circuits

before and after a retrofit to verify energy and dollar savings;

- Verify a manufacturer's stated efficiency on newly installed equipment;
- Validate that the energy efficiency goals of building design are being met on an on-going basis for building commissioning and LEED certification;
- “Shadow” the utility meter to provide a real-time snapshot of energy usage to allow budgeting for monthly energy charges before the utility bills for them.

In addition to the direct benefits of improving operational efficiency through implementation of green practices, some states are beginning to offer tax credits for both new and renovation projects that incorporate sustainable building practices based on LEED certification levels. As today's health care facility operators face ever-tightening operational challenges, new technologies and strategies will be needed to keep pace with rising costs while, at the same time, maintaining or improving service quality levels.

One such energy strategy, performance-based contracting, can result in major cost savings with little or no up-front investment. Utilizing project-related savings to underwrite energy improvements on a pay-as-you-go basis, submetering technology can be used to identify inefficiently operating equipment, allowing repair or replacement. The cost savings realized from reducing operational inefficiencies can then be applied to other areas, including deferred maintenance or installing other energy-saving equipment or services.+

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