Energy Monitoring: Real-Time, Real Smart

by greg zimmerman, executive editor

Yes, it's true that you can't manage what you don't measure. But it's time to attach an addendum to that tried-and-truisim. It's this: You can't manage what you do measure, but don't have a plan in place to act upon. These days it's easier to collect massive amounts of data than ever before, but if there's no strategy for how to use that data, having unmanaged data is just as bad as having none at all — in either case, nothing good happens. "Just looking at data on a computer screen won't change anything," says Jerome Conrad, energy manager at McGill University. "Success is a matter of creating methods and processes to analyze data and do something with it."

The smart grid, better technology, and less expensive submeters have all combined to make monitoring energy use in real time much easier — the benefits of which are many, from cost savings to identifying malfunctioning equipment quickly. The most successful real-time energy monitoring always begins with a plan of how the data will be used prior to plastering submeters willy-nilly all over a facility.

But where do you start? And how do you set up a system to reap the most rewards? Experts who have been successful in setting up real-time energy monitoring all have one common piece of advice: Don't bite off more than you can chew.

"It's about starting small and building sophistication over time," says Jay Black, director of sustainability for SL Green. "Become accustomed to dealing with this volume of data. Design, implement, learn, and repeat. We keep gradually improving to allow for new opportunities. It's a process of refinement."

Choose How to Manage Data

At his 40,000-student Montreal campus, Conrad has deployed more than 400 meters, an unmanageable number to monitor manually. "It's easy to be overwhelmed with data," he says. "So that's why you need a solution that can arrange data for you. That's what we did first. Before installing meters, we actively looked for a package to analyze data."

Keeping that software set-up manageable is important as well. "The imagination is the limit on these real-time monitoring systems, but then reality sets in," says George Paterson, manager of the Energy Control Center at the University of Iowa. His colleague, energy engineer Katie Rossmann, echoes this sentiment: "You can build something you think is really cool, but if it's not usable or if it's overly complicated, it won't be adopted. Don't keep yourself from being innovative, but be smart about where to spend resources and time."

What's more, just as with any piece of facility equipment, a key criterion to choosing how to manage data is how much maintenance of that data will be required — less is almost always more.

Indeed, the human element to managing real-time energy data shouldn't be underestimated. While it's important to minimize the time and effort required, it's also necessary to understand that..."
“there’s no such thing as a set-it-and-forget-it technology,” says Black. Buildings themselves are like people — quirky and mercurial. “It takes time to get to know the buildings,” says Conraud. So no matter how precise benchmarks and standards might be, it still takes a human to make a real-world judgment about what action is required.

And truly, no matter how simple a real-time monitoring system starts or how it evolves in complexity, the critical question about how effective a system will be is how the data can be used to effect positive results.

Benefits of Real-Time Data

“Data by itself doesn’t accomplish anything,” says Paterson. “You need to learn how to turn data into actionable information.” Adds Rossman: “You can write a million fault-detection rules, but if there is no process to respond and prioritize, then you’re not successful. You can’t magically fix a VAV box only because you’ve learned a valve is stuck.”

The ability to respond to energy-wasting problems is the most important benefit of real-time energy monitoring. But the question often arises, how can I justify the cost of this complex system that doesn’t use energy itself, and therefore has no direct return on investment?

For Paterson, this question represents outdated thinking. Today, real-time data is as non-negotiable an ingredient to energy management as computers are to the average office worker. “This is an essential piece of infrastructure if you want to manage energy,” he says. But still, devil’s advocates may wonder what can be done with real-time energy data that can’t be done with the energy data from the monthly utility bill.

Simply put, says Conraud, real-time data allows immediate action. “This is how we catch a ventilation system put on manual load when it shouldn’t have been,” he says. “In this case, a week of 24/7 operation could destroy the savings for a whole year.” At McGill, Conraud is just wrapping up a five-year efficiency plan that started with the installation of meters and his real-time monitoring system. In that time, McGill has reduced its energy intensity by 20 percent and its greenhouse gas emissions by 29 percent. Conraud is now looking at implementing another five-year plan using the real-time monitoring data to find further ways to save energy, including implementing Six Sigma principles, as one possibility.

Immediate ROI

Yes, the benefits of real-time energy monitoring are many. And even if, from a cost perspective, you don’t buy the “essential infrastructure” argument, Black offers another: immediate ROI. In his case, in New York City, installing the software and infrastructure in partnership with a third-party vendor (i.e., with no upfront cost) allowed his organization to take immediate advantage of incentives from the local utility for demand-response.

In regard to the question of real-time versus less-frequent interval, Black says real time is a no-brainer. “It allows for better decisions; decisions at a more granular level. If we don’t have the incremental data, we couldn’t make these decisions.”

And that’s the rub: The true benefit of real-time energy monitoring is allowing a continuous process of optimizing systems, detecting and correcting problems, and ultimately, saving energy.

You might even call this, as Black