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It's 2011: Time for Energy Management to Enter the Information Age

By **Bill Holmes, P.E.** May 16, 2011 02:56:36 pm[Email](#)[Print](#)[Like](#)

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My friend, an architect and the owner of an energy consulting business, and I had just finished our meeting with the director of energy conservation and his chief engineer for a state that will remain unnamed. Obviously a smart guy, the director had degrees in both engineering and law. He was new to his job and the field of energy conservation, so it seemed like a good time to talk to him about our approach, experience and results over the past 30 years; using actual monitored information to identify opportunities, create and maintain energy savings on an ongoing basis.

What I had experienced in every project for more than 30 years (and now several electric utility companies and many others such as Google have learned and are promoting) is, if you want to cut your energy costs and consumption, the single most important piece of information you need, the single most important point to monitor is the utility meter. The meter is where your energy comes into your facility. Every dollar you spend goes through that meter and with that information alone, you can see when every dollar is spent. That is the information used to calculate your bill every month.

Your utility company does it at the end of the month, but if you can watch your meter – and now you can through the Internet – you can calculate and track your consumption and costs every hour, every day. You can see when your lights or air conditioner are on and what the cost is. The single most important piece of information is the utility meter.

Trying to manage your consumption and costs without knowing what is coming into your building, without meter data, would be like trying to balance your checkbook (as if anyone ever does that anymore) or manage your finances to keep from overdrawing your account, without knowing how much had been deposited and when. Or like trying to fly a plane without knowing how much fuel is in your tank. It makes about as much sense. As James J. Hill, president of the Great Northern Railroad in the mid-1800s, realized more than 150 years ago, "Intelligent management must be based on exact knowledge of facts. Guesswork will not do."

Buying Solutions before Identifying Problems

After we finished our presentation, the director said it was interesting but he already had everything he needed; he was doing all that was required to conserve energy in the state-owned buildings. He was working with a major temperature controls company and spending millions to put energy management systems in all of the buildings. "How interesting," I thought; he already has a very expensive solution for all of his buildings before he knows what problems each has, what each one really needs. Standard procedure these days, it seems. So I asked him, "How many utility meters are you monitoring?" It was a trick question. I had a strong hunch what the answer would be. He turned to his engineer who replied "I don't believe we are monitoring any meters." The single most important point to monitor to save energy, and out of 175 buildings, not a single meter, not one. Not according to his engineer.

"What about your reports?" I asked. "What do they look like? How do you track and verify savings? How do they compare with ours?" I knew what was coming next, it always does. I've heard it for years: "We will check with our control company, and let you know."

The Keyword There is "Control."

It is important to remember that a temperature control system is just that, a control system, not an

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Author Bio



Bill Holmes, P.E.

Bill Holmes, P.E. founded Holmes Energy LLC www.holmesenergy.com and developed the AutoPilot Monitoring-Based Commissioning (MBCx) System in 1979. He has a B.S. and M.S. in mechanical engineering and has done additional coursework and research for his PhD. He is a former Purdue professor and taught for several years in the Continuing Education in Energy Management Program at the University of Wisconsin.

Bill has produced savings from 20% to, in a few projects, more than 50% from low-cost, no-cost changes in management, operation, maintenance and control alone in all types of facilities including Industrial Plants owned by Fortune 500 Companies.

He is the recipient of a DOE Award for Energy Innovation and was the Indiana Energy

energy monitoring or energy information system. About 30 years ago, some marketing genius came up with the name "Energy Management System (EMS)" for a control system because it had the ability to turn things on and off and energy conservation was a hot market. Technically, their systems do have the capability; the hardware and software to provide reports, if they were connected to the right points and if they had any incentive to provide such reports. Control systems typically monitor temperatures, humidities, airflow switches, equipment status, freeze-stats, valve and damper positions, etc.; all required for proper control, but not the right points for monitoring energy. It's a different business.

For example, we installed a PC-based AutoPilot Energy Monitoring System in a Honda-owned plant several years ago to allow them to assign energy costs to specific systems and product lines so they could include utilities in their per-unit costs. They put the PC in the engineering office, ironically on the same desk as the PC for their energy management system – the EMS they had purchased a year or so before after being assured it would produce all of the reports they wanted, but never could.

Don't just take my word for it; I copied the following quote from the DOE website:

"Current building energy management and control systems provide building owners and operators with limited technical capability to measure the performance of building energy systems, diagnose operation and maintenance problems, and identify longer-term and cost-effective energy saving opportunities. Credible documentation of the long-term energy and cost-saving benefits of advanced sensors is needed, as well as an information management infrastructure capable of clearly indicating where changes are needed most and providing credible cost/benefit analyses for decision-making. Improved diagnostic systems have the potential to provide these capabilities plus an improved indoor environment, increased tenant satisfaction, and reduced maintenance and energy operating costs."

In normal, non government-speak, I think that statement is attempting to say that you need the right information presented effectively, and energy management systems typically don't do that.

Good Science?

My friend's wife is a nurse who runs a surgery center for a large hospital. We knew she would be interested in hearing about our meeting with the state director, so we were trying to think of a way to make some sense of what we had heard and explain it in non-engineering terms. I said, "You know, after 35 years, the entire energy management field is still based on bad science. It always has been."

What if medicine worked like energy conservation? You could go into the ER with chest pains. The first step would be a "walk through physical exam" similar to a "walk through energy audit" – the one where you are sitting in the ER waiting room and a doctor walks through the room and diagnoses your problem. Based on her recommendations, they would admit you, perform quadruple-bypass open heart surgery and send you home in a few days with a sack full of drugs and a physical therapy plan. They would do it all without ever hooking you up to an EKG or putting a stethoscope to your chest – without gathering any data to find out what was actually wrong with you, they would provide the solution. They already knew what you needed. Why bother with all of those expensive instruments and that aggravating testing?

Not a bad analogy if I do say so myself. After the state spends a few million dollars installing all of the control systems that were designed without bothering to define the specific problems in each facility, and the director of energy management calls the control company to check on the reports to see how much energy they have saved, he shouldn't be surprised to hear what one of my previous clients actually heard in a similar situation: "As you know, we have been trying to produce some reports for you ever since you met with that troublemaker guy from Colorado, but we can't do it. It just isn't possible with our system. Sorry. But rest assured, we are the experts and we are producing the maximum savings possible."

The director can reply, "Thanks. That's good enough for me. I would hate to hear that after I spent all of those millions of dollars I wasn't getting everything I should. It would make me look really foolish, like I didn't understand basic problem-solving and financial management."

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