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## How to Manage Energy Costs Like All Your Other Costs

By **Bill Holmes, P.E.** July 9, 2013 03:00:00 pm[Email](#)[Print](#)[Like](#)

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After seven years in the Air Force, much of it working with advanced instrumentation systems on jet fighters, I started an energy conservation department for an engineering firm. It was July 1974, the middle of the oil embargo and first energy crisis. With my instrumentation background, it was quickly obvious that most buildings had no effective energy information systems (believe it or not, more than 35 years later they still don't; not much has changed) and as a result, were wasting huge amounts of energy.

In 1979, I started my own business and built my first building energy monitoring system. It was installed in a mental health hospital and the resulting information was used to reduce the annual energy consumption and costs by 59%. I thought that for my first project, I had lucked onto the least efficient building in the country. But then instrumentation installed in schools, churches, hospitals, office buildings, shopping malls, libraries, recreational facilities and more during the next several years revealed similar waste in every building.

What we learned in the field was quite different from what is taught about saving energy and accepted and practiced by most. We learned that:

1. All buildings waste a huge percentage of the energy they buy.
2. Changes in operation, maintenance and control alone can reduce energy costs by 20%, 30% and in some cases, more than 50% in non-industrial buildings.
3. Tremendous savings can be achieved with existing equipment in existing buildings, without capital projects.
4. People are the key; technology is only a tool.

We learned that by using actual monitored data and applying good management and engineering problem-solving techniques, efficiencies could be improved and waste minimized. Results could be achieved essentially by just tuning up building energy systems. Savings started the first day! Along with efficiency, think about the other benefits of tuning up a car – they are very similar for a building: improved performance, better reliability, longer equipment life and more. No sacrifices, no discomfort, really no downside at all; those myths only come from unqualified people trying to block things they don't understand and they have really given legitimate energy conservation a bad name.

### Industrial Facilities

After a few years, when my company, Holmes Energy, was managing 25 or 30 non-industrial buildings, we were contacted by Golden Castings, a foundry looking for ways to save money. Copies of their utility bills showed that they were spending more than all of our other clients combined. According to the conventional wisdom at the time (and still widely believed) we were told that "We couldn't touch production." The place where 90% of their energy dollars were being spent was off-limits. All we were going to be able to do for them was recommend more efficient lighting or to shut off the office air conditioning at night. But I thought, what the hell. They are using a lot of energy and spending a lot of money; this could turn out to be interesting. We could learn something. So we signed a contract and installed a monitoring system.

At the beginning of the project, Golden told us their largest energy consumer was a giant electric furnace where they melted iron for engine blocks. Of course, that was a critical process and could not be changed. But you know what the actual monitored data showed? That electric melting furnace that

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## Author Bio



### Bill Holmes, P.E.

**Bill Holmes, P.E.** founded Holmes Energy LLC [www.holmesenergy.com](http://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

was the biggest user of electricity (that you couldn't change); it wasn't. The biggest user of electricity was the compressed air system, a support system, not directly part of the casting process, and more than 35% of the electricity it was using was being wasted.

Basic problem-solving requires keeping an open mind; basing decisions on fact. Without the facts you really don't know. At first we would go to each industrial plant before we signed a contract to see if it was a good candidate. We would spend a day looking for opportunities to save energy, similar to a walk-through audit. But you know what we quickly learned? Every industrial facility was a good candidate, similar to what we had found out about all other types of buildings. But you can't tell what to do, where the opportunities are from an energy audit. There is absolutely no way to know without actual monitored data. Energy usage patterns in a large facility are very complex and change every hour of every day. And even with our years of experience, we were always surprised; in every single project. We found problems that had existed, in some cases for 25 or 30 years. They were hidden and had been overlooked by everyone until the instrumentation exposed them.

We learned that rather than expending a substantial amount of time and money up front on an audit, the first step in every energy project should be to install permanent instrumentation; there will then be an ongoing and very accurate energy audit, 24 hours a day, 365 days a year. The installation of permanent instrumentation is the best energy investment that can be made, with a payback in weeks or months. In the hands of workers who understand their facility, good, accurate, continuous information presented in a clear format is the way to find, achieve and maintain real savings. It can be used for unit costing, to assign responsibility and accountability, to avoid unnecessary expenditures, detect potential problems, manage utility consumption, properly size new equipment, plan for growth, verify savings from capital improvements and much, much more.

I think most people assume that businesses are effectively managing their energy usage simply based on the cost. But as a result of a huge disconnect between managing all other costs and managing energy costs in buildings, nearly all businesses are ignoring what could, in some cases, could be their No. 1 opportunity to increase profits. I have instrumented industrial plants spending a million dollars a month on energy with almost no understanding of where those dollars were going while at the same time tracking and rationing pads of paper.

It's actually very simple; the management techniques have existed for years; they just need to be extended to utility costs. We sold and installed two systems in huge industrial plants owned by G.E. and GenCorp to be used for Six Sigma projects. Measuring and quantifying the energy data and then applying the Six Sigma techniques resulted in tremendous savings. GenCorp identified the project as the single best opportunity to improve profits, corporate-wide. I wrote and published articles on both projects but more than 10 years later nearly all businesses are still ignoring this huge tremendous opportunity.

I think of every building as an airplane. The technology has been around for years – I worked with it in its early stages; the first On-Condition Maintenance System on the brand new F-15 fighter in 1972, nearly 40 years ago. As a result of instrumentation, information, accountability, training and enforced standards, flying on a commercial airliner is now as safe as taking a nap on your living room couch. Airplanes don't waste fuel either; they can't afford to and stay in business.

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Manager of the Year in 1990. He has published numerous papers and been making presentations on his projects and methods for more than 25 years. Bill is a sculptor, a writer and a regular contributor to Sustainable Plant.

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