

Ideas That Work!

The Midnight Audit

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ABSTRACT

The midnight audit provides valuable insight toward identifying opportunities to reduce energy consumption—insight that can be easily overlooked during the normal (daytime) energy auditing process. The purpose of the midnight audit is to observe after-hour operation with the mindset of seeking ways to further minimize energy consumption during the unoccupied mode and minimize energy waste by reducing unnecessary operation. The midnight audit should be used to verify that equipment is off when it is supposed to be, or operating in set-back mode when applicable. Even a facility that operates 2 shifts per day, 5 days per week experiences fewer annual hours in occupied mode than it does during unoccupied mode. Minimizing energy loads during unoccupied hours can save significant energy, which is why the midnight audit is an *idea that works*.

TIMING IS EVERYTHING

One of the more interesting things I learned about energy audits is that *timing is everything*. One of the fundamental steps in energy auditing is determining how energy is being consumed. By how, what we really mean is determining an end-use breakdown of who, what, when, where, why, and how much. Once you know how energy is being consumed, you may then investigate methods to reduce consumption through improved management, efficiency, or conservation.

Most energy auditors understand they only see a snapshot of the facility operation. Energy auditors observe equipment operation during normal work hours. They collect equipment data, take measurements, and record logs. Energy auditors also interview supervisors, operators, and maintenance staff about the equipment and its operation. All of this

effort supports the objective of seeing the bigger picture so they can annualize the analysis for the energy audit.

THE MIDNIGHT AUDIT

One of the more enlightening aspects of energy audits—to me, anyway—was what I learned during the midnight audit. That’s what we called it. In reality, it was more like 2:00 AM to 6:00 AM. While most energy may be consumed during normal working hours, and it may certainly be easier to observe equipment operation during normal working hours, it is—in my opinion—easier to identify wasted energy outside normal working hours. During the midnight audit, I find it easier to spot equipment or lights that could be turned off or at least set back in some fashion. In some industrial environments, it may also be easier to *hear* some energy saving opportunities during the midnight audit. Opportunities you might never spot during normal working hours can become glowingly obvious during the midnight audit. The midnight audit is applicable to any industry and any facility. At the very least, it provides a different perspective—a perspective I have found to be very useful and enlightening.

Even facilities with building automation systems (BAS) controlling heating, ventilation, and air-conditioning (HVAC) and lighting systems can benefit from the midnight audit. While the BAS can help manage the operation of large loads, there are two things to consider: First, not everything is connected to the BAS. Plug loads and smaller equipment operating when most of the facility is shutdown or in set-back mode may still be wasting a significant portion of the total facility energy consumption. Second, how confident are you that equipment is off just because you think the BAS is programmed to turn it off? Are you sure all the BAS overrides have been reset? Are you confident the control relay is functioning properly?

I have read a lot recently about companies using interval meter energy data to observe how facilities operate and using interval metered energy data to support the energy audit process. I do appreciate the growing proliferation and availability of interval energy data. Periodic reviewing of interval energy data can substitute for some (but not all) aspects of the midnight audit. Charts can inform you about the level of night-time loads. However, it still requires investigation (aka, midnight

audit) to determine if the current night-time load levels are appropriate. Could more things be turned off or set back? Once the baseline night-time load level is optimized, reviewing the charts can suffice until you spot a growing trend in load that tells you it is time for another midnight audit.

CONCLUSION

I have learned a lot during midnight audits, some of it enlightening and some of it concerning, but all of it beneficial to my clients. Some of the more enlightening observations have included documenting equipment left on overnight when day-shift supervisors claimed the equipment was always turned off at end of shift. Documenting policies, improved communications, re-training employees, and posting signs can go a long way toward addressing these energy-saving opportunities. Of course, some corrections may involve more sophisticated approaches, such as interlocking relays, motion sensor switching, or interconnecting the equipment to the BAS and programming schedules. I believe the midnight audit is a valuable tool providing unique insights to facility operation, which is why I consider it an *idea that works*.

ABOUT THE AUTHOR

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