

# Re-Evaluating How to Save More Energy

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Are you responsible for managing and reducing energy and energy cost? If so, you most likely have thousands of vendors - from metering to energy monitoring and reporting software vendors - pounding on your door. Everyone seems to have the “right solution” for your building or facility. If you have implemented energy saving solutions, you may have asked yourself;

1. “Why don’t I see a larger reduction in usage?”
2. “Am I really saving the energy I expected?”
3. “Why is my energy usage continuing to go up?”
4. “Why can’t the vendor fix this?”

Before trying additional solutions may we suggest evaluating some of the fundamentals of HVAC systems and their associated control systems as the right place to start, or start over? The HVAC system after all, consumes the most energy in buildings. There is a wealth of studies on re-commissioning or retro-commissioning to confirm that HVAC and control systems’ sequences of operation need to be evaluated and “tuned up” on a regular basis to optimize the energy and system performance. Even the Measurement and Verification part of LEED certification is valid for only one year. It makes sense to regularly evaluate what and where changes have occurred in the building.

The place to start is with an understanding of the space loads in your building. The loads in the spaces impact all aspects of the mechanical and energy consuming loads of the entire building or even campus. If you have a building automation system that will log and display all of the airflows for all the Variable Air Volume (VAV) boxes in those spaces for at least 24 hours or more continuously, you should be able to obtain some valuable information. Information such as;

1. The number of boxes in minimum and maximum flow during the measured period,
2. The total number of boxes where the airflows remained in higher than the minimal set point for long periods,
3. If any boxes were close to maximum flow for long periods, you will have an understanding of the space load conditions.

If your system has the ability to log box airflow and space temperature then you should be able to get a good profile of each box to allow you to evaluate the zones, floor, or total load on air handlers and the entire mechanical system.

Some interesting studies done by a number of industry organizations have identified that after a building settles into “occupied load” most VAV boxes stay in minimal airflow. Add to that the fact that building occupancy has reduced to about 50% due to “virtual offices” and the current economic conditions, and it’s likely that significant load changes may have occurred in the building after the control system was installed. So your systems may be generating 55 degree air to condition a space temperature of 70-72 degrees for spaces that are not occupied or only partially occupied. This is the reason new control sequences of operation need to be evaluated and integrated with other systems such as card access for occupancy zone or space location or tracking and lighting control.

But it does take someone analyzing the data, a good building automation software platform to collect the data, and implementation of new control sequences based on real time information - not fixed schedules and sequences. To understand what is happening, analyze the data and reach new levels of energy savings without major mechanical and control system modifications will take an investment in “Energy Utilization and Information Management Software”.

A fundamental issue with most building automation systems is the ability to collect and analyze large amounts of data to give owners and users information in a way they can use it on a real time basis, instead of just printouts of temperatures or specific values. A good Information Management Software platform will analyze all the values based on business rules, not control set points, and display the results in a way the user can then take appropriate action. If a building manager or owner could take the VAV box and space or load data, and apply a pre-load functionality library based on greatest efficiency factors, the owner would have the ability to identify and implement different strategies. More sophisticated software would take the information and recommend action steps based on the real time data for the given building loads at that point or automatically implement reset and load change strategies. As an example; what if the software was able to identify people or occupant locations based on data integrated from the card access system to only condition required spaces. Plus be able to count the total number of bodies by zone or space to provide the indoor air quality and ventilation for those areas. Coupled with the same strategy for lighting control the potential for reducing the space required load conditioning could offer significant energy savings.

Now you might be thinking this sounds either too bizarre or it has been tried before with poor results and therefore is not viable. But the newer I/P based building automation systems and the newer Information Management and Middleware software platforms available are making these types of strategies a reality. If all the building systems are I/P based, high speed LANs or even better integrated over the IT network at the device or controller level so that data sharing is always at the I/P level then the software platforms can use the data in more much sophisticated applications.

Once all the low hanging fruit has been picked to save energy it will take a much more “holistic” and sophisticated approach with applications that are real time dynamically based to generate the additional energy savings that needs to be realized. The key will be a top down Enterprise

Level fully Integrated Information Management approach instead of the more traditional hardware or system bottom up approach.