Let's Save Energy

School Energy Managers Project

ENERGY STAR AWARD 2014 PARTNER OF THE YEAR

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Load Profiles . . .

Why should I care?

In electrical terms, a **load profile** is a picture of the use of electricity throughout the day, week or month. The load profile shows how the magnitude of energy use varies throughout the period as equipment and lighting are turned on and off as temperatures and room occupancy change throughout the period. Electric utility companies use this information to plan how much electricity they will need to make available at any given time.

Why is this important for a school board member to understand? The answer has to do with money.

The greatest (peak) amount of electricity a utility company provides is typically during a weekday – the same time that schools are in session. Load profiles help to identify this peak. To meet this peak, utilities construct large generating facilities such as the Kentucky Utilities Ghent Power Plant in Gallatin County. Because power plants are becoming increasingly more expensive, utilities encourage customers to manage their electrical usage, not only throughout the day, but at these peak times. To recognize the cost to supply the peak, utility rates have been established that will charge a significantly higher rate for the peak usage as compared to usage at other times during the day.

Board members impact the district's energy usage through decisions made regarding inclusion of energy management technologies to more efficiently manage building temperatures when constructing new or renovating facilities. Because of the technical aspect and the changing technology in this area, these are not simple decisions to be taken lightly, but if not carefully considered can lead to waste of thousands of taxpayer dollars over the life of the facility. Using technology to identify a building's load profile 'is and extremely cost effective investment.

Energy Managers in ACTION . . . Load profile control

Energy managers Chris Baker, Kimberly Joseph and Jimmy Arnold discuss the use of load profiles in managing their district energy resources during a recent SEMP training session.

Technology has vastly improved over the past decade. This can be seen by the various "demand response" technologies to identify a load profile now available that provide live data for energy managers to use in reducing their amount of electricity being used at peak.

Several Kentucky school districts have become among the leaders in use of these technologies. Chris Baker (Kenton County), Kimberly Joseph (Bullitt County) and Jimmy

Energy Managers is Action . . .

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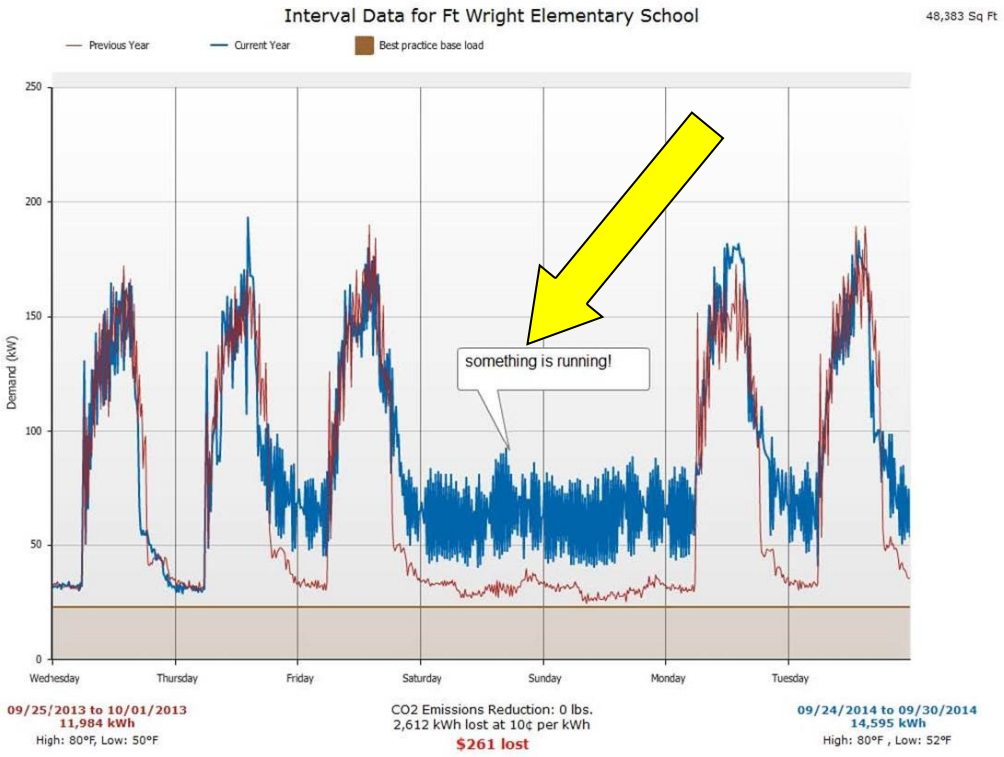


Before Fall Break, energy manager Chris Baker carefully analyzed load profiles for Kenton County Schools to ensure mechanical systems were working properly. The profile above identified a mechanical issue that was corrected before the break ensuring proper setback of temperatures.

Arnold (Butler County) recently participated in the panel discussion at the School Energy Managers Training in October in Lexington.

Baker began the discussion by painting the picture. As she described the weekend load for Fort Wright Elementary School, she noted that on the surface it appeared that all mechanical systems were working properly and the building temperatures were on unoccupied. In viewing the building's load profile, she found that something *is* running and registering an abnormally high usage. Working quickly with the building automation system, they found that a recent controls upgrade had caused the chiller to run 24/7. In one weekend, the situation cost the district almost $200 in electricity costs. Without access to real-time interval data and load profiles, it could have taken months or longer to discover this issue.

Joseph described similar findings in Bullitt County through use of a load profile. The system she uses not only provides live load-profile data, but allows for direct temperature control of the majority of the district's facilities. This has been important for energy savings and providing the best environment for their students and teachers.

Joseph was quick to add that their monitoring systems have identified mechanical systems problems before they have become a huge problem. "Our building automation system provides alarming on all HVAC equipment, from individual heat pumps to cooling towers," she added.

Joseph went on to describe the numerous minor problems the alarms have identified and her response of generating a work-order for the HVAC techs. "Better to catch something when it has a loose belt or simply a dirty filter, before it becomes a burnt up motor or damage has been done to a compressor," she said. The alarms on the HVAC equipment and freezers/coolers have saved tens of thousands of dollars over the years.

Arnold is known to other energy managers in the state as being tight when it comes to resources spent on energy.

"During the day, my goal is to keep teachers, staff and student comfortable," he said, "but as soon as school is out for the day, the building is mine." He checks his monitoring systems routinely to ensure the buildings are moving to unoccupied mode properly. Arnold has also monitored the buildings long enough to know that he can reduce energy consumption an hour before school is out, without impacting the learning environment, but yet avoiding the most costly time of day for electricity.

The Benefit of an Energy Manager

During the original SEMP grant, Mercer County found significant benefits in having an energy manager available to work in their district. Following expiration of the initial SEMP funding in 2012, district leaders decided they were able to maintain the required utility tracking records as well as manage their energy consumption, but found that this work required more focus than was earlier realized.

Energy Manager John Clemons

Beginning in July 2014, Mercer County joined the Jessamine County Partnership, where energy manager John Clemons was already employed. In updating the utility tracking and rate comparisons, Clemons immediately identified that one account was on a non-optimal rate. By requesting the utility change the rate of the Mercer Athletic Complex, the district will save approximately $5,300 annually.

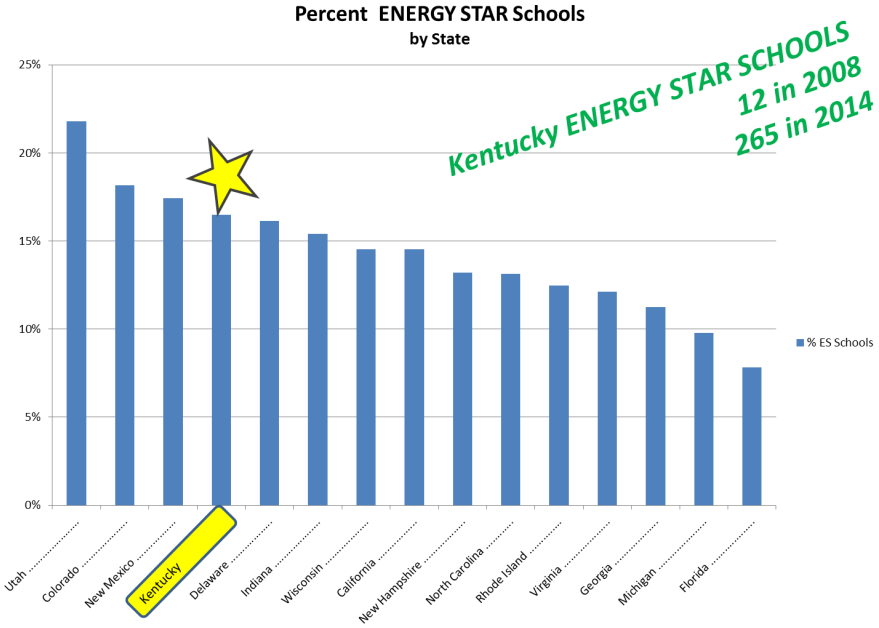
A second potential rate change opportunity is under watch at a school where repurposing of the facility has led to a decrease of 400 students. With a few more months of usage monitoring, there may be significant enough energy use reduction to qualify for a lower utility rate.

A third savings opportunity is being explored as well. New football stadium lights were installed and put on a separate account which has a demand (peak) charge associated with it. The first time the field lights are switched on each month, a demand charge of over $700 is instantly applied regardless of how many hours the lights are used that month. By connecting the stadium lights to the nearby school, the district will be able to eliminate this demand charge as the school establishes the demand charge during daytime hours. As a result the cost to operate the lights will be only for energy used each month during the nighttime hours. Estimates are being gathered to find out how much it will cost to do the work and verify that the nearby school will be able to handle the increased load.

Up-to-date utility rate knowledge and continuous billing comparisons are required to avoid lost savings opportunities through facility use and utility rate changes. Having saved enough money this year to pay for an energy manager services for some time to come, Mercer County leaders are pleased they made the original decision to join the program.

Kentucky ranks 4th in the nation!

Congratulations on YOUR efforts to save energy



EXAMPLE OF A SCHOOL DISTRICT
WINTER SETBACK CHECKLIST

Name _____ School _____

Date _____ Time _____

Setback Action		**Completed**
1.	Turn off electronic whiteboards, projection systems, computer monitors, printers, scanners, etc. Confirm with district IT regarding turning off computers	
2.	Turn off and unplug TVs, DVD players, coffee pots, and any other non-essential classroom/office electronic equipment	
3.	Clean out and unplug personal refrigerators. Leave the door open	
4.	Turn off all classroom lights. Turn off AND unplug any personal lamps	
5.	Never hang items from ceiling where lighting sensors may be located	
6.	Turn off nonessential exhaust fans	
7.	Set exterior lights to turn off during daylight hours (this should be done at every day, but would be good to confirm)	
8.	Turn off all display case lighting	
9.	Reset controls OR thermostats to recommended setback temperatures	
10.	Unplug chilled-water fountains, except in occupied areas. Check and report any leakage of water fixtures	
11.	If temperatures fall below freezing, plan on inspecting buildings on days when no one is working in the building to ensure proper operation	
Notes/Observations		