

# A Tale of Two School Districts Implementing Energy Management Programs

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## ABSTRACT

This article describes the implementation of energy management programs in the Scott County School District located in Georgetown, Kentucky, and the Woodford County School District located in Versailles, Kentucky, along with the results obtained. It considers the unique ability that K-12 schools have to implement energy management programs with their student bodies. When students become engaged, outstanding results can be achieved. The process used and the results obtained in both school districts will be discussed with a special focus on student engagement and the resulting impacts.

## BACKGROUND

In 2008 the Kentucky State Legislature passed legislation requiring all school districts to develop energy management plans to help offset the rising energy prices that were being faced by all school districts in the state. At the time the author was working as the assistant director of maintenance for the Scott County School District located in Georgetown, Kentucky. Georgetown is the home of the Kentucky Toyota Manufacturing plant. The school district has doubled in student population in the past twenty years since Toyota located in Scott County. Today, the Scott District has over 9,000 students, 1,700 employees and over 1.4 million square feet of space. The district has a preschool, eight elementary

schools, three middle schools, a ninth grade school, a traditional high school and a high school that focuses on career development. The annual energy costs of the district totaled over \$1.2 million dollars when the energy management program was started in 2009.

During the first year, the author worked to jumpstart the program as he has a passion for energy management and teaching students how to save energy. He recruited a district energy management team composed of district administrators, and representatives from all areas within the district including teachers, principals, maintenance and transportation personnel, parents, plus outside experts in the field of energy management. The lead person for the Toyota Energy Management Program was also a part of our district energy management team. As we were beginning the Energy Management Program, we would hold meetings monthly to develop energy management plans, set policies and establish goals. Today, we now meet a couple of times each year to review program metrics and energy conservation measures (ECMs) that are being implemented. The first energy management plan that was presented to the Scott County Board of Education was about getting the students involved in the process and establishing set points for temperature settings for both winter and summer months during both occupied and unoccupied periods. It is very important that these set points be approved by the top administrators and confirmed by the school board.

In July 2013, the Woodford County School District located in Versailles, Kentucky and adjacent to Scott County, requested assistance with initiating their Energy Management Program. For the past two years the author has been working with the Woodford County School District to implement an Energy Management Program similar to the one in Scott County. The Woodford County School District is less than half the size of the Scott County School District with only 4,000 students and 0.6 million square feet. Their energy bill was roughly \$0.6 million annually. The district has four elementary schools, a middle school and a high school. It has made significant improvements at all schools without spending excessive amounts of capital funds on Energy Conservation Measures (ECMs). The school district finished eighth in the nation in the 2014 National Building Competition. Each of its schools has made significant improvement when compared to their energy use baselines. Their goal is to achieve Energy Star ratings for all schools in the district.

## RESULTS

The results for both districts will be presented prior to discussing the key factors that make a K-12 school district’s energy management program successful. The results for both districts are documented using the Energy Star Portfolio Manager rating system. The results for Scott County Schools are shown in Figure 1.

All of the schools in the Scott County School District have achieved the Energy Star Award. Northern Elementary is the school that required the most improvement in order to achieve its Energy Star Award. The key component that Northern Elementary had more than any other school in the district was student engagement. The school had a teacher

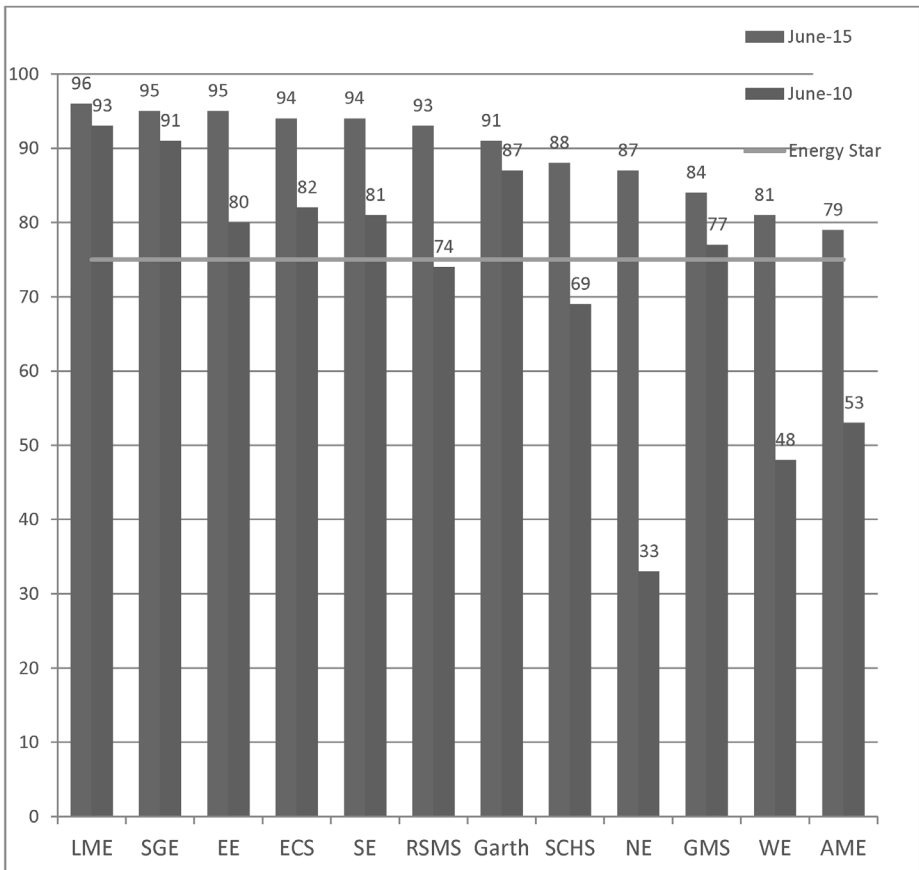


Figure 1. Scott County Schools Energy Star Portfolio Manager Ratings.

who served as the student team leader who was able to get the students engaged. Everyone at the school participated. It is amazing what can happen when students become involved and support the program. Another example from the Scott County School District is GMS. The school had an awesome teacher/ student energy team leader that helped it earn the first Green Ribbon School.

Award in 2012 with an Energy Star rating over 90. A couple of years ago this teacher no longer led the student energy team. The Energy Star rating has since declined and the school is now the third from the bottom on the list of Energy Star ratings for the district. Another example is Garth that has experience ups and downs depending on the level of student engagement.

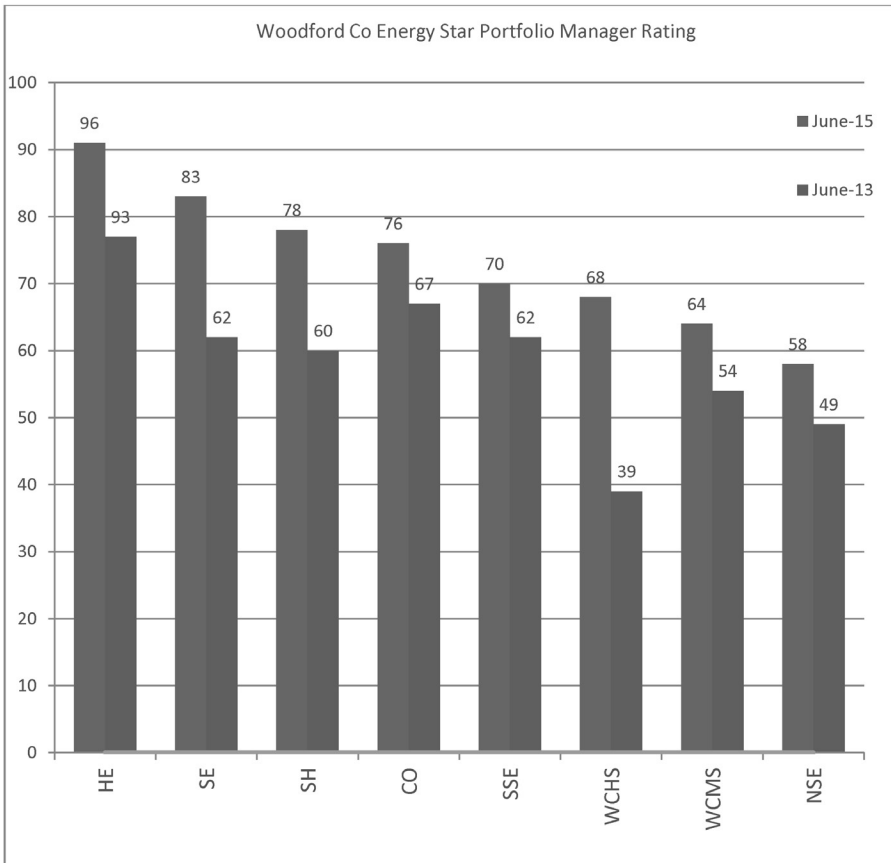


Figure 2. Woodford County Schools Energy Star Portfolio Manager Ratings.

For the Woodford County School District, student engagement was a priority with or without a good teacher/student energy team leader. We still have a teacher at each school assigned as the student energy team leader as we have in Scott County. I have since discovered that a successful energy management program depends on how much passion the person who is assigned as the student team leader has and to what extent they succeed in getting and maintaining student engagement. For the two years that I worked with the Woodford County School District, I visited each classroom in the district at least once a year, talking to the 4,000 students in the district and explaining how to reduce energy usage at home and school. Since the largest use of energy at school or at home is heating and cooling, I told the students to make sure outside windows and doors are not left open. Since lighting is the second largest energy user at school and in many cases at home, I told the students to make sure that the lights were turned off when no one was in the room. Other instructions were to make sure all equipment (e.g., computers, projectors, smart boards, etc.) was turned off when not in use. This effort has been very effective as each school has improved over the past two year as shown in Table 1.

## IMPLEMENTATION STEPS

The steps needed to implement the program for the Woodford County School District will be discussed next. The support of the management team was important to initiating the program. After an initial meeting with the district's Chief Operating Officer (COO), a meeting was held with the district's Superintendent. Based on my experience with Scott County Schools and after consulting with other school energy managers, I understood that without the Superintendent's support, the program would risk failure. During my meeting with the Superintendent, I explained that my focus was to obtain student engagement as that is the best pathway to a successful program. It is important that the students learn skills that include how to save energy in their personal life as well as at school.

The next step was to present the plan to the school board. I explained the process that we were using in Scott County and the results that were obtained. This provided Board members with the information they required to decide whether or not to support the plan. The Board decided to proceed with the plan.

Table 1. Woodford County Schools National Building Competition.

<b>National Building Competition</b>					
Facility Name	2013	2014	2014	2014	Rank for Kentucky Buildings
	Source Energy Use	Source Energy Use	Change From 2013(%)		
Simmons Elementary	155.5	128.8	-17.2%		1
Woodford County High School	163.9	141.6	-13.6%		2
Woodford County Central Office	138.2	122.5	-11.4%		3
Southside Elementary	150.6	137.2	-8.9%		6
Huntertown Elementary	125.5	115.3	-8.1%		9
Northside Elementary	169.8	159.1	-6.3%		13
Woodford County Middle School	145.2	137.3	-5.4%		16
<b>Total</b>			<b>-10.2%</b>		<b>8</b>
<b>Woodford County Schools Ranked 8th in the Nation for Teams</b>					
<b>*</b>					

I next met with the school principals. My experience working with Scott County Schools taught me that if a school's principal chose not to support the program, optimum results would not be achieved. In the meeting with the six principals, four of them were very supportive. I informed the district's COO that I was concerned about the two schools where the school principals were lukewarm in their support. She informed that the Superintendent would discuss the program with both school principals. The next time that I visited their schools they had a completely different attitude and were far more supportive. Considering the results from Woodford County, the two schools that made the most improvement are the schools where the school principals were initially unsupportive. This indicates that when the school principal supports the program, the students are more likely to become engaged and outstanding results are achievable.

After gaining the support of school principals, it was important to attend a staff meeting of all teachers and staff to explain the program and ways they could help. Most staff employees may not realize that over half of the energy that is used by a school is for heating, ventilating, and air conditioning (HVAC) systems. Leaving exterior doors and windows open (which happens often), can be costly for the school district. The primary intent of the program is to help eliminate wasteful energy usage. This is easier when building occupants understand how they can help. They may need assurance that you are not trying to make them work in uncomfortably hot or cold conditions. One goal is actually to provide the optimum conditions for the students to do their very best. Getting the school's custodians and maintenance staff actively involved in the energy management program is another key to success. They directly influence on how much energy a school district uses. When they are involved and motivated to save energy, they have a major impact on the results of the district's energy management program.

Another large user of electrical energy in schools are lighting systems. Having everyone turn off the lights if they are the last ones to leave the room saves energy. Students enjoy being the control point and catching their teacher leaving the lights on when they are not in the room.

## KEY OBSERVATIONS

These case studies can apply to any organization. The support of top management is critical to energy program success. The primary dif-

ferentiator that a school district has that other organizations often lack is a team of student occupants. When students become involved outstanding results can be anticipated.

## IMPORTANCE OF MEASUREMENTS AND COMPETITION

To improve in any area, one must first determine where you stand compared to similar organizations. An excellent benchmarking tool for assessing energy usage in buildings is the U.S. EPA Energy Star Portfolio Manager Rating system. It is a web-based assessment program available for free. By loading all of the required data into Portfolio Manager, a building's energy performance rating (from 1 being very poor to 100 which is excellent) is determined which allows you to see how your building compares to others. The Energy Utilization Index (EUI) expressed either as source or site is a very good measurement as well. I have found in my experience that it is easier for most people to understand the Energy Star Portfolio Manager Rating system than the EUI. When a building receives a rating of 75 or better, it is eligible for the Energy Star Award for that year.

I have also found that school boards are most interested in dollars saved or avoided cost. These seem to be the biggest items on their agenda as they are always looking for more money to make their school districts better. I have also discovered that the program will be better if you hold monthly competitions, documenting which schools have the most energy reduction when compared to their energy usage in the previous year. Even if there is no monetary reward, they win the right to display a banner in their school for the following month. It is considered a matter of school pride and the winning school has bragging rights over the other schools in the district. We have held monthly competitions in the Scott County School District since November 2009. During that time Northern Elementary has the record number of wins by winning the Energy Reduction Banner 15 months during this period. We have held a similar program for Woodford County Schools for the past two years with great success.

## ENERGY CONSERVATION MEASURES

In my experience working with both school districts, I have found that the best approach is to begin with low or no cost Energy Conserva-



tion Measures (ECMs). If you begin implementing a few ECMs that cost very little money and obtain results quickly, you will win over those who might believe that an energy management program will not be successful. These can be simple items like getting everyone to turn off lights or keeping outside doors and windows closed which cost nothing. Then you can implement low cost ECMs that pay back quickly, such as replacing any incandescent exit signs with light emitting diode (LED) exit signs. These projects usually pay back in a number of months. Anytime building systems are using energy 24 hours a day and seven days a week, this is an excellent place to find potential ECMs. A good example is florescent troffers that burn continuously for security purposes. If the fixtures use T12 lamps and can be replaced with LED fixtures or upgraded with an LED kits, these projects provide quick paybacks due to the energy cost savings and also the reduced maintenance cost of replacing lamps. These types of projects can provide a payback in months and not years.

As a school district completes the ECMs that are considered “low hanging fruit” providing savings with little or no capital funds, the next series of projects should be medium cost projects that have good paybacks. These can be highly efficient lighting system improvements (most likely converting to LED lights) or improved control systems for the HVAC systems. With better control systems, a school district can eliminate wasteful energy usage when the school is not in session. Some school districts make the mistake of thinking that if they spend millions of dollars on ECMs that they will automatically save a lot of money. I have found in my experience that if the students and staff are not educated on what is wasting the energy or they do not have someone who is responsible for managing the systems, it doesn’t matter how much money is spent, they may not achieve the anticipated savings.

## SUMMARY

The key point that I would like for readers to take away after reading this article is that school districts have an advantage that other organizations typically lack. Schools have groups of students that can be mobilized to make an energy management program successful. The other key point is that you must have top management support and approval for any program to be successful. Finally, you must establish a

baseline and measure and report results frequently. The timing must not be too far removed from the actual usage of the energy. To report energy usage months after fact does little to help change behavior. Therefore, it is better to report results weekly.

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#### ABOUT THE AUTHOR

**Jim R. McClanahan** is employed by the Scott County Board of Education as an energy manager. The school board has an agreement with the Kentucky Association of School Boards (KSBA) School Energy Manager Project (SEMP) that allows him to work as the energy manager for the Scott County School District and also to assist other school districts throughout Kentucky. He is currently assisting Woodford County by training a new energy manager and he has started assisting the Bourbon County School District to get their energy management program started. For the prior five years Jim McClanahan worked as the energy manager and assistant director of maintenance for the Scott County School District located in Georgetown, Kentucky. For the prior two years he has also served as the energy manager for the Woodford County School District in Versailles, Kentucky. Jim worked as the assistant director of maintenance for the Scott County School District from 2007 to 2010. From 1999 to 2006, Jim served as a legislative member of the Scott County government. Previously, Jim worked for IBM/Lexmark as an engineer, first line manager and middle manager for 26 years.

Jim is a Certified Energy Manager (CEM) as well as a Professional Engineer (PE) in mechanical engineering and industrial engineering. Jim has a BSME degree in mechanical engineering from the University of Kentucky, a masters degree in industrial engineering from Texas A&M and an MBA from Xavier University. Jim has a passion for working with students to teach them how to save energy at home and at school. Jim has been married to Janet for 46 years and they have two children who are married with six grandchildren. Jim can be reached via email at [jim.mcclanahan@scott.kyschools.us](mailto:jim.mcclanahan@scott.kyschools.us).