



Illinois' Greening Your School Program Case Study

School Type: High School

School/District Name: Lockport Township High School District 205

Location: 1323 East Seventh Street
Lockport, Illinois 60441-3899
(Administrative Center)

1333 East Seventh Street
Lockport, Illinois 60441-3898
(East Campus)

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Project Type(s): Energy conservation

Project Description:

The Lockport Township High School consists of two campuses. In October 1999, Lockport Township High School's East Campus started an energy conservation program. A comprehensive energy conservation plan addressing electricity use was developed.

An energy audit was conducted throughout the entire 489,000 ft² East Campus. The maintenance department went to every equipment room in the school and calculated how many kW's were being used for each piece of equipment at max load. A spreadsheet was set up compiling all the data in an easy to read format. The school was able to verify the data by monitoring real-time electric meters. This was very important tool in the early stage of the program. The school did not have any type of building automation system when the program began. The only piece of equipment was a real-time energy meter from Exelon (Commonwealth Edison).

While this was going on, the Director of Facilities Management educated himself on electric rates and tariffs gaining a better understanding of their specific rate. This was very important because once he understood how the demand charges were calculated he found easy ways to save thousands of dollars right away. For example, they have a 900-ton chiller that is an energy hog. The school learned to pre-cool the building during non-demand and non-peak hours and thus lowered total demand during the school day. Summer demand charge is \$16.41 per kW. By eliminating one high demand day of 1,250 kW's and maintaining the high demand round 1,000 kW's for the rest of the month, they saved over \$4,102.50 by just that one decision. The school now knows their load profile, which is the same every year, and now knows what usage should be before they even use power. Energy goals are set every month and it is easy to live within those goals.

Behavioral changes aimed at reducing energy consumption were implemented. The kitchen was one area of focus. It was determined that during full load 242 kW's are used to operate the kitchen every day. The kitchen staff would start the electric food warmers at 6:00 am every day even though food was not put in the warmers until 10:30 a.m. A big savings was realized by having the kitchen staff start the warmers at 10:00 a.m. Another example of behavioral change is with the band students. They use the auditorium to practice during the day and would turn on all the house lights the stage lights, the foyer lights, everything. They were asked to only turn on the one stage light which resulted in a cost savings.

The next level of savings came after a building automation system was installed. The School Board gave approval to investigate the next step to improve the energy

conservation plan. After a year of rigorous investigation, the maintenance department decided to purchase a Lonworks open protocol building automation system (BAS). This means that the school is not tied to one contractor or manufacturer for the life of the system.

The school then looked for ways to reduce the demand load for the boiler room and chiller penthouse. It took over a year to really understand the most efficient way to operate the boiler room and chiller plant. All was done on trial and error basis, nothing complicated, just common sense. An example of a change is that they now run the four-pipe building system like a two pipe system. The school saw no reason why to run heating and cooling at the same time. Also, there is an exact setback schedule for the hot water temperature.

Getting control of the 144 room units was a big savings. In the past the units were on timers and the maintenance staff had no real way of knowing if the units were on or off. Many times the night set back thermostat was changed by a teacher or student and instead of the units going off at 3:30 after school, the unit would run all night. Once they gained control of the room units, the school was able to realize more savings.

Getting control of the exhaust fans were another big savings. Instead running exhaust fans in empty room exhaust fans until 10:00 p.m. every night, the fans are now shut off when the room unit goes off. Each room has an occupancy sensor, so if the room is empty, the unit goes off.

Project Length: 1999 – Present

Benefits: Cost savings, adding years to equipment life, productivity gains and improved indoor air quality are some of the benefits. The school will reap the benefits from the operational improvements long after the BAS is completely installed.

Funding: Funded by the school. This project was done completely in-house. No consultants or energy management companies were used. The Director of Facilities believes that no one knows the building systems as well as the maintenance staff. He says that the maintenance staff spend a third of their life working in this area, and he feels that they know their system and an outside person cannot tell them the most efficient way to run their building after spending two-hours walking around the building. It took the maintenance staff years to learn how to operate the building correctly. Nothing was very complicated, they just made a commitment and once they started seeing how easy the savings were to obtain, the whole department got excited and is still monitoring and calculating efficiency daily.

Costs: As of Spring 2004, the school has spent around \$300,000 implementing the system. They will probably spend around another \$150,000 to finish the school over the next two years.

Cost Savings: Currently, the payback period is a 1 to 1 payback period. Over \$110,000 dollars in energy savings have been realized in the 2003-2004 school year. The district thinks they can repeat or even improve on this next year and every year after that.

Next Steps: The school plans install sensors that monitor air quality.

Bill Thompson summed up the project in the following way "...we just learned how to run our building as efficiently as possible and eliminated all the waste. It was not any one big thing; it was a series of little improvements that added up."