

# Take Control of Demand:

## Green Bay Area Public School District Reduces kW Charges, Saves Money

### CASE STUDY

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**T**ake a close look at your energy bill. Does your school pay demand charges? If so, you could be wasting money by not managing your peak energy use. Staff at the Green Bay Area Public School District recently realized that growing kilowatt (kW) use pushed them into a different – and more costly – rate class. Instead of giving in and paying more, they decided to make several smart "demand limiting" decisions to reduce kW usage.

This project involved programming a demand limiting system in four of the district's high schools and three elementary schools. The Green Bay Area Public School District comprises 35 elementary, middle and high schools and oversees over 20,000 students. These schools will not only reduce peak electricity use in the summer months, but their twelve month demand drops as well. It is expected to save over 1,446 kW or savings of an estimated \$100,000 annually of peak electricity use.

#### CONTROLS HELP MANAGE DEMAND

Southwest High School was the catalyst for this demand reduction project. The high school's demand charges began to exceed one megawatt, which automatically pushed it into the next rate class. This shift also resulted in an estimated \$10,000 in extra charges. A project team was created and its challenge was defined: reduce the school's kW use to under 1,000 kW. This team included two members from the Green Bay Area School District (Bruce Kitzman, Manager of Facilities, and Jeff Christens, Controls Technician), Nathan Nygaard from Focus on Energy and Bob Laskowski, an Account Executive from Wisconsin Public Service, the district's utility.

Jeff Christens identified a chiller control strategy that could maximize kW savings. He listed several steps utilizing controls, to unload the chillers. These steps included night purge, pre-cooling and set point temperature elevation. After the team agreed to test his strategy, Mr. Christens conducted manual tests to control the peaks. This test was created to determine if the building would react appropriately.

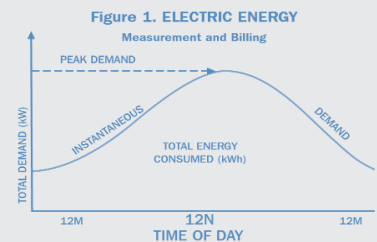
"The tests were critical," noted Jeff Christens. "They allowed us to make sure that the chillers would reset correctly and keep the building's occupants comfortable." After the tests were successfully completed, the control strategies were programmed into the high school's Energy Management System. The bottom line savings? Southwest High School reduced its demand by 596 kW and has sustained this reduction.

After the controls work was completed at Southwest High, the team implemented a variety of controls changes at six more schools.

#### WHAT'S A DEMAND CHARGE?

Most business customers pay for energy in two ways: 1) total electric consumption over time and 2) the maximum amount of energy used at one specific time. Total electric energy consumption over time is measured in kilowatt-hours (kWh) of electricity.

The maximum amount of energy used at one specific time is called demand and it is measured in kilowatts (kW) of electricity. Throughout a billing period, a demand meter tracks the peak instantaneous power load. The chart below illustrates both kWh and kW usage. Demand is represented by the highest point on the curve.



This demand level indicates how much electricity your electric utility must provide to meet your largest demand. You are charged for this demand, even though you may operate at this level for only a short period during a month's billing cycle.

You can think of demand charges as "overhead" expenses that your utility incurs for providing an electric supply that is capable of meeting your largest load. The utility company then passes this cost on to you. If you (and other electricity users) can reduce peak demands, then utilities will not need to maintain as many power plants or build new ones.

## THE BOTTOM LINE

School	2002	2005	kW Savings
	Peak Demand	Peak Demand	
Beaumont Elementary	136	127	9
East High School	1,105	743	362
Kennedy Elementary	172	150	22
Preble High School	799	676	123
Red Smith Elementary	558	486	72
Southwest High School	1,269	673	596
West High School	1,090	828	262
<b>Totals</b>	<b>5,129</b>	<b>3,683</b>	<b>1,446</b>

The Green Bay Area Public School District estimated the project cost to be around \$100,000. The district was fortunate that Jeff Christens could do a lot of the programming changes himself. However, he worked closely with two local contractors, System Services and Energy Control and Design, to complete the project. Both contractors are Focus on Energy trade allies.

Focus on Energy, Wisconsin's energy efficiency and renewable energy program, provided the district a financial incentive to offset the cost of implementing this demand reduction project. The district is no stranger to Focus on Energy or its energy efficiency services. District staff has worked collaboratively with Nathan Nygaard, a Schools and Government Energy Advisor, on many energy saving projects, including the implementation of variable frequency drives, steam trap repair and replacement, lighting projects and controls projects.

"We have a good working partnership," noted Nathan Nygaard. "This district was one of the first in the state to start an energy committee, and I'm pleased to be included as a member of this committee."

In fact, this committee, which includes members from around the district as well as Mr. Nygaard, also includes Bob Laskowski from Wisconsin Public Service. The committee has two key goals: find ways to reduce the district's energy costs as well as "get the word out" to all staff and students about the benefits of energy efficiency.

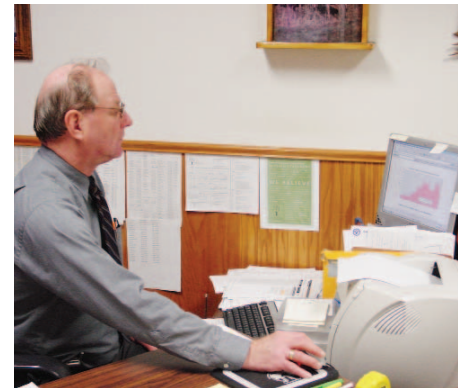
Based on the benefits from this most recent energy reduction project, the committee is meeting both goals.

### PROJECT TEAM

Green Bay Area School District - Implementation  
Focus on Energy - Technical support and grant  
Wisconsin Public Service Corporation - Customer support  
System Services and Energy Control and Design - Equipment support

### FOCUS CAN HELP YOU

If you are interested in learning more about peak demand reduction or other energy efficiency opportunities, contact Focus on Energy at 800.762.7077 and ask to speak with a member of the Schools and Government Team. Or visit our Web site at [focusonenergy.com](http://focusonenergy.com).



Bruce Kitzman, Manager of Facilities, reviewing the Energy Management System.

### HOW KW SAVINGS WERE ESTIMATED

*It is often more difficult to estimate the savings from demand reduction projects than from typical efficiency projects. A multi-step process was followed.*

*First, Nate Nygaard and Jeff Christens identified schools with high peak kW demands that would meet the criteria for a demand control project. Then, they examined two year histories of each school's electric load. Finally, they estimated what the correct kW set point should be and when the demand limiting system should activate.*

*Using this process, they found that in four of the schools the actual savings were greater than estimated. In the combined project (four high schools and three elementary schools), the savings were greater than the 200 kW that was estimated.*