

Power for the future

for schools of the future

Twenhofel School and Powersmiths Team Up to Enhance Learning and Save Energy

PROFILE

The Kenton County Board of Education is committed to building high performance schools to meet student needs in northern Kentucky. Twenhofel Middle School is a recent example of the Board's commitment to progressive education and the environment.

OBJECTIVES

Recognizing the environmental benefits and cost savings that accrue with "green building," the Kenton Board was determined to meet or exceed LEED (Leadership in Energy and Environmental Design) certification requirements. Twenhofel Middle School incorporates a wide array of innovative conservation technologies in a building that in itself serves as a teaching tool for ecology and sustainability principles. To help establish energy conservation best practices for all future projects, the Board selected Twenhofel to test the benefits of installing "super-efficient" electrical transformers versus standard off-the-shelf transformers.

THE SOLUTION

Powersmiths' unique offering of super-efficient transformers, energy data-acquisition systems and 3D learning systems attracted the attention of Robert Lape, the Director of Facilities for the Kenton County School System.



To evaluate the efficiency of electrical transformers, five standard transformers

and five Powersmiths super-efficient *E-Saver C3* transformers were installed. All transformers supply electrical power to similar operating equipment. By installing Powersmiths' *E-Saver C3* transformers to serve the sixth-grade wing and standard transformers to serve a similar seventh-grade wing, the Board could easily and fairly evaluate and compare the efficiencies of the two transformers.



Twenhofel's Energy Manager, Chris Baker understands the importance of maximizing electrical energy efficiency. Powersmiths' *Cyberhawk* energy monitor helps Baker evaluate and manage electricity use at the school. It also plays a role in providing energy consumption data used by the school's administrators to measure the savings achieved by each grade level wing. These and other measures are used to determine the winner of the school's monthly conservation contest.

In addition, Powersmiths develops and implements information technology systems that translate real-time electrical usage into energy and environmental education. Powersmiths' *Windows on the World (WOW)* 3-D learning system was supplied to Twenhofel. The *WOW* system helps students gain a better understanding of the real costs of electricity usage and waste in terms of dollars and environmental impacts.

Powersmiths reduces electrical waste to put more money back in the classroom

THE RESULTS

In October 2006, a test was conducted to compare the efficiency of Powersmiths' *E-Saver C3* transformer to a standard transformer with the same size rating. Powersmiths' *Cyberhawk* was used to measure the electrical energy waste generated by the standard 150 kVA transformer compared to the waste generated by Powersmiths' same-sized *E-SaverC3* transformer. The efficiency of the *E-Saver C3* far surpassed the transformer.

"I was not aware of the magnitude of savings until we tried both types of transformers side by side," said Robert Lape. "The Powersmiths transformer provided significant percentage savings over the standard transformers we were using in the same building." Indeed, the savings were dramatic. The *E-SaverC3* demonstrated a 70% reduction in energy losses; produced fewer total harmonics and contributed soft benefits in the form of reduced noise.

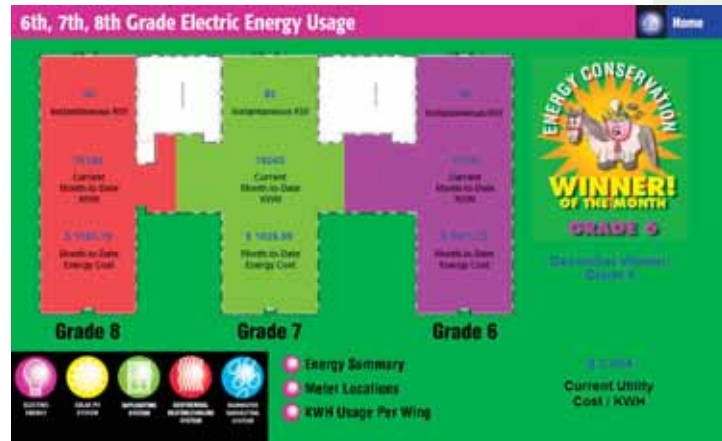
Transformer Savings <i>Extrapolated from one week comparative study</i>	Baseline Standard (150 kVA)	Powersmiths' E-Saver C3 (150 kVA)
Annualized calculated energy loss	10,231 kWh	3,103 kWh
Operating Cost	100%	30%

*Avoided heat loss only. Does not include charges or cooling costs. Actual savings are higher.

CONCLUSION

Twenhofel Middle School students are actively engaged in conserving energy. Data provided by Powersmiths' *Cyberhawk* allows students and staff to measure and evaluate their conservation efforts.

Tests conducted at Twenhofel demonstrate that Powersmiths *E-Saver C3* transformers generate significantly less waste than standard transformers and provide a



quieter work environment. On a go forward basis, the school benefits through substantial reductions in operating costs and an enriched learning environment. Of equal importance is the positive contribution that the school can make towards improving the health of the community through reductions of smog-producing particulate matter and greenhouse gases.

Transformer Operating Costs at Twenhofel Middle School	Annual Operating Cost*	Life Cycle Operating Cost & Savings*	
SCENARIO:		25 years	40 years
(All) Standard Transformers	\$ 7,945	\$289,664	\$599,052
(All) Powersmiths' E-Saver C3	\$ 1,521	\$ 55,454	\$ 114,684
Savings with Powersmiths	\$6,424	\$ 234,210	\$484,368

*Savings are calculated based on Kenton County's 8.0 cent/kWh cost.

Annual Reduction in Greenhouse Gases (per EPA)	Equivalence
42 tons of CO2	8 acres of trees
137 tons of coal	emissions of 6 cars
332 kgs of SO2, 143 kgs of NO2	6 homes heated