

Wausau West High School: Wisconsin School Upgrades its HVAC and Utility Systems

EnergySmart School Close-Ups highlight schools and school districts that have found ways to use energy more wisely, lowering their energy bills and raising awareness of energy issues.

- Improving Existing Buildings
- Financing Building Improvements
- Operating and Maintaining Buildings
- Designing New Buildings
- Teaching and Learning
- Using Renewable Energy Technologies
- Using Alternatively Fueled School Buses



In the early 1990s, Wausau West High School began experiencing problems with indoor air quality and energy inefficiency. Responding to these issues, the school's Facility Manager researched retrofit strategies to determine the best available option to both improve the indoor air quality and reduce energy consumption. After weighing various options, the school chose to pursue a new heating, ventilation, and cooling (HVAC) strategy called Regenerative Dual Duct technology.



Wausau West High School's large facility

Heating and ventilation upgrades

The HVAC project was part of an overall upgrade and renovation plan for the high school. The HVAC upgrade involved utilizing a whole new strategy for the design and operation of the ventilation system, including:

- Replacing the existing ventilation system with a hybrid natural and mechanical system
- Utilizing a direct/indirect evaporative heating and cooling system
- Introducing 100% outside air into the ventilation system
- Preheating ventilated air with exhaust air



A Campaign of Rebuild America
U.S. Department of Energy



PROFILE:

Location:

Wausau, Wisconsin

District size:

1,850 students
175,000 square feet

Energy saved:

18,587,893 MBTU's
from July 1998 to
September 1999,
without a full year of
upgraded HVAC opera-
tion

Dollars saved:

\$85,518 (mostly due
to HVAC upgrades)

Project funding:

District funding

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See the EnergySmart Schools Web site at:
www.eren.doe.gov/energysmartschools

Or call the Energy Efficiency and
Renewable Energy Clearinghouse (EREC)
at: 1-800-DOE-3732

Other energy efficiency improvements at the school included converting the greenhouse operation from propane to natural gas, switching kitchen equipment to natural gas, and changing the water booster heater from electricity to natural gas. In an effort to re-vamp the school's boiler system, the high school converted from steam to hot water boilers; replaced three 9-million BTU boilers with a new hot water system of seven 2-million BTU boilers; and switched domestic hot water from steam heating to direct fired.



Wausau West High School

Energy savings

The installation of the new ventilation equipment reduced the fuel and electricity consumption of the school. The upgrade has reduced the number of air handlers by seven, decreased the size of equipment, encouraged the installation of multi-use systems and heat recovery equipment, and converted steam boilers to hot water boilers. The chiller requirements have been significantly reduced by replacing the original 640-ton chiller with a 20-ton chiller in the office area, a 30-ton chiller for the music room and auditorium, and a 50-ton ice bank unit in the main building.

The energy reductions have been validated by the Cooperative Educational Service Agency in Chippewa Falls, Wisconsin. For the period of July 1998 through September 1999, the school saved over \$85,000—without even a complete year of upgraded HVAC system operation. The first quarter of the 1999-2000 school year resulted in over \$37,000 in savings, indicating that savings were accruing at a rate well over \$110,000 per year.

Future improvement and upgrades

Renovation and upgrades will continue at Wausau West High School with future replacement of the lighting systems. These upgrades will result in even more energy savings and improvement to the learning and teaching environment at the school.



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