SHEREN
ENERGY SERVICES

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Energy Services Case Study
Customer: Pellston Public Schools, Pellston, MI

The Challenge:
The Pellston Public School System faced several significant challenges. The aging buildings (the high/middle school building and the elementary school building) were in dire need of mechanical improvements. Not only were the buildings' inefficient systems not conducive for a comfortable learning environment, they were costly both in terms of operation and maintenance. Furthermore, the school system faced rising energy costs and constrained budgets.

The Objectives:
- Lower overall energy consumption
- Lower the cost of energy
- Lower cost of operation and maintenance
- Enhance the learning environment

The Solution:
Sheren conducted an in-depth energy analysis and audit to understand where and how the school system was using energy. Based on the customer's objectives and our findings from the analysis and audit, Sheren Energy Services tailored a step-by-step action plan with specific recommendations. Following is a high-level overview of five Facility Improvement Measures recommended and implemented by Sheren Energy Services:

1. **Upgrade lighting throughout the two school buildings with the following components:**
    a. Retrofitted existing fluorescent lighting to higher efficiency T8 fluorescent lamps with electronic ballasts.
    b. Converted the existing 400 watt metal halide lighting to T5 fluorescent lamps with electronic ballasts in the gymnasiums.

2. **Upgraded the existing Energy Management System (EMS).**
    a. Controlled boiler water discharge temperature per returning water temperature and outside air temperature.
    b. Controlled air handling units in gymnasiums with variable frequency drives and CO2 sensors.
    c. Replaced standard V-belts with cog style belts.
    d. Added components to EMS to control operation of heating and cooling equipment only during periods of occupancy.

3. **Controlled operation of concession machines.**
    a. Installed controls on all beverage and snack machines to limit their operation during unoccupied periods.

4. **Replaced electric baseboard heating with the following equipment:**

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a. Removed existing electric baseboard heating in hallways, entrances, etc.
b. Installed hydronic heating baseboard system and connect to hot water boiler system.

5. Upgraded heating systems.

a. Removed existing Cleaver Brooks boilers in High/Middle School.
b. Removed domestic hot water systems in High/Middle School.
c. Installed four 90+% efficiency Munchkins hot water boilers.
d. Installed two hot water storage tanks.

The Results:

Accounting for the number of heating degree days decreasing by 8.3%, the net result of the five Facility Improvement Measures for the High School/Middle School and Elementary Schools follows (tracking from 2003 to 2006):

- Electrical consumption decreased 35.3%
- Electrical costs decreased by 16.1%
- Electrical unit costs ($/kwh) increased by 29.6%
- Natural gas consumption decreased 52.2%
- Natural gas costs decreased by 29.7%
- Natural gas unit ($/CCF) costs increased by 47.0%

The Pellston School Board is extremely pleased that Sheren Energy Services achieved such dramatic cost savings, while improving operation, efficiency and functionality of the schools' learning environments.