**EXISTING BUILDING COMMISSIONING CASE STUDY**

**Horizon Middle School**
Moorhead, Minnesota

**PROJECT BACKGROUND**
Despite its recent construction, Horizon Middle School used excessive amounts of energy throughout the year and there were comfort and pressure issues in the building. As a result, Moorhead Area Public Schools District considered recommissioning the building to address these issues.

**INVESTIGATION**
A comprehensive recommissioning investigation of Horizon Middle School was conducted in 2008. Building systems were analyzed using a combination of field observation, diagnostic testing, and building automation system trending. Further testing was performed on the indoor pressure differentials as these gave indication of operational issues and had been investigated previously without resolution. Several significant Energy Conservation Opportunities were identified to reduce energy costs with an attractive payback.

**IMPROVEMENTS**
One area of focus was on the pressure problems with regard to the outside. The entrance doors stood open, making it a security risk, and the hallways were windy. The supply fans were over-powering the return fans, causing the economizer dampers to let more outside air in than needed and over-pressurizing the school.

Another area of focus was the heating loop for the AHUs. The constant speed pump was left on whenever the outside temperature was below 80°F, even though no heating was done below 60°F. Other opportunities involved improving the efficiency of the hot water system, expanding the automation systems to optimize the discharge temperatures from the AHUs, and creating modes of operation at low occupancy.

Implementing all of the recommended improvements would cost $422,600. Horizon Middle School would save $141,227 annually, leading to a payback of 3.0 years.

**PROBLEMS**
- Very high energy use
- Pressure relationships causing door to stand open
- Comfort complaints in computer labs

**SOLUTIONS**
- Install VFDs to control fan flows
- Expand automation system
- Eliminate simultaneous heating and cooling
- Install supplemental cooling in computer labs
- Control use of heating loop pump
- Improve efficiency of hot water system
- Optimize control of air handling units during low occupancy
- Develop low occupancy modes of operation

**ANNUAL SAVINGS**
- Electricity: 686,244 kWh; $18,000 (14% of total)
- Peak demand: 142 kW; $23,000 (9% of total)
- Natural gas: 66,418 therms; $100,000 (36% of total)
- Carbon footprint reduction: 828 tons of CO2

**FOR MORE INFORMATION CONTACT:**
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