Detector Electronics
Bloomington, Minnesota

PROJECT BACKGROUND
The main manufacturing facility of Detector Electronics used a significant amount of energy. The facility staff recognized that its annual energy costs of over $300,000 was excessive for the size of the building and decided to have a recommissioning study conducted to lower their energy costs.

INVESTIGATION
A comprehensive recommissioning study of Detector Electronic’s main manufacturing facility was conducted in 2009. Building systems were analyzed using a combination of field observation, diagnostic testing, and building automation system trending. Portable data loggers were also used to capture how equipment not on the building automation system operated. Several significant Energy Conservation Opportunities were identified to reduce energy costs with an attractive payback.

IMPROVEMENTS
The building doesn’t have separate systems for cooling and hot water and heating. Instead, a core water loop is served by cooling towers and boilers. 56 heat pumps located throughout the facility extract heat from or reject heat into the core water loop and transfer that energy to and from the air in the space, depending on the space’s needs. Five make-up air units provide fresh outside air for ventilation.

Due to the unusual HVAC system, significant trend data analysis was necessary to understand the systems and identify improvements. Analysis revealed that heat pumps and make-up air units were operating more than necessary. Turning them off when the spaces were unoccupied saved energy. The make-up air units and heat pumps were wasting energy by heating and cooling at the same time. Adjusting their controls solved this problem.

Implementing all of the recommended improvements would cost $79,700. Detector Electronics would save $44,550 annually, leading to a payback of 1.8 years.

PROBLEMS
• Very high energy use
• Controlling the unique HVAC system

SOLUTIONS
• Balance the core water loop flows
• Reset the core water loop setpoint temperature
• Install variable frequency drives on the cooling tower fans
• Implement lighting controls
• Implement better temperature control and optimum start
• Optimize make-up air unit discharge air temperature
• Optimize roof top units

ANNUAL SAVINGS
• Electricity: 518,000 kWh; $25,600 (15% of total)
• Natural gas: 18,950 Therms, $18,950 (38% of total)

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