CASE STUDY
IMPROVEMENTS
Office Tower
Bloomington, Minnesota

PROJECT BACKGROUND
Of three similar electrically heated buildings in the complex, this office building had the highest use per square foot. Comparison with other office buildings in the Upper Midwest showed that its source energy use was in the top 10 percent. As a result, its owner asked CEE to recommission the building.

INVESTIGATION
A comprehensive recommissioning investigation of the office tower was conducted in 2005 - 2006. 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
The building is cooled and ventilated primarily by a single large variable volume built-up air handling system. Cooling is provided by two water-cooled electric centrifugal chillers and heating is provided primarily by perimeter electric radiant ceiling panels.

CEE suggested leveraging the existing HVAC system. Setback, warm-up, cool-down routines could reduce energy use during unoccupied hours. Other areas of focus were the main air handler fan flow balance, damper coordination, building pressurization control, and duct static pressure control. More potential savings could be attained by conducting targeted air-sealing and moving control of the radiant panels to the building automation system.

Implementing all of the recommended improvements would cost $121,400. With an estimated recommissioning conservation rebate of $34,800, the office building would save $54,800 annually, leading to a payback of 1.6 years.

PROBLEMS
• Very high energy use
• Staff comfort complaints

SOLUTIONS
• Conduct targeted air sealing
• Implement night setback and morning warm-up routines
• Move control of radiant panels to BAS to minimize simultaneous heating and cooling
• Reduce problems with air handler fan flow balance, damper coordination, and pressure control

ANNUAL SAVINGS
• Electricity: 1,127,800 kWh; $45,000
• Peak demand: 84 kW; $9,800
• Carbon footprint reduction: 303 tons of CO2

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