

Case study

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Renton School District Energy upgrades result in \$30,000 annual savings Renton, Washington

Spanning thirty-five square miles, Renton School District serves elementary, middle and high school students in the city of Renton. In partnership with the community, it is the district's mission to provide a safe and respectful learning environment for all students to realize academic, social and personal achievement. Renton School District believes in high quality instruction and learning for every child, every day, in every classroom and environment.

Challenge

The fifty-year-old systems at Dimmitt Middle School were expensive to operate and maintain. In addition, the old single-pane windows were allowing cold air infiltration during the heating season and intense solar gain in the early fall and late spring, causing an increase in energy usage and occupant discomfort throughout the school year.

In keeping with its mission to provide a quality learning environment, Renton School District sought to implement infrastructure upgrades in order to better serve its students. With energy expenses rising and state funding decreasing, the key objectives of the multi-dimensional project were to reduce the district's energy costs on an ongoing basis, develop solutions to address inefficiencies and aging equipment, reduce maintenance costs, improve system reliability and maximize utility company incentives, while simultaneously improving overall occupant comfort.

Solution

When grant money became available through the State of Washington's Energy Savings Performance Contracting (ESPC) program, Renton School District took advantage of the opportunity to initiate its much-needed upgrades. The district began by selecting Trane as its Energy Services Company (ESCO), collaborating with the district's Office of Resource Conservation Management.



Renton School District provides a safe, respectful learning environment at twenty-eight schools.

Identifying energy saving opportunities

To identify the best course of action, an Investment Grade Audit (IGA) of district facilities was completed. Energy calculations were performed using Trane TRACE 700™, an energy analysis and modeling program. Loads were analyzed, system parameters were evaluated and energy consumption was calculated to develop a base model. Using a two-phase construction project methodology, the team developed plans to replace aging mechanical equipment, and upgrade energy control systems and windows, all within an aggressive four-month timeframe. Energy Conservation Measures (ECMs) were prioritized based upon the audit analysis, with facility staff interviews instrumental in shaping the project scope and direction.

High efficiency boilers reduce fuel consumption

Two gas-fired steam boilers were replaced with two modular, high efficiency boilers with stack heat exchangers and zonal control valves, all digitally controlled and networked into the building energy control system. Savings were expected through improved turndown ratios and inherently more efficient firing, as well as significant overall system improvements resulting from reduced thermal mass loss at daily startup / shutdown.

Variable frequency drives increase efficiency

Variable frequency drives (VFDs) and differential pressure controls replaced inefficient, constant volume circulating pumps throughout the facility, permitting less water to be pumped through the system and saving energy. The VFD's will be used to "soft start" the pump motors, significantly reducing stress on the motors, bearings, pump couplings, and adding years to equipment life.

Window replacements strengthen thermal barrier

The single-pane glass and fiberboard wall panels with deteriorating rubber seals in the district's middle school classrooms provided an ineffective thermal barrier. Efficiency improvements included the replacement of 500 single-pane windows with low E, tinted, double-pane glass window systems and glazed foamcore panels.



Major mechanical equipment upgrades, and automated zonal control, ensure optimal climate control, resulting in substantial energy and maintenance savings.

Results

Mechanical system and building envelope upgrades at Dimmitt MS have resulted in a 42 percent drop in natural gas consumption, a reduction in electricity usage and decreased maintenance costs, while occupant comfort and the learning environment have been greatly improved. With the upgrades, Renton School District is realizing annual energy savings of \$20,000 and \$10,000 in avoided maintenance cost.

The school district is, not only pleased with the energy savings and environmental benefits, but also with Trane's ESCO services. "The Trane project manager was an incredible communicator. He oversaw the whole project and commanded the respect of subcontractors," said J. Stine of Renton School District - Office of Resource Conservation Management. "During complex projects there are always issues that need to be addressed; Trane management was solution oriented - we could not have done it without them!"



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