

# Case study

November 2011



## Uinta County School District #1

*Upgrades achieve \$190,000/yr energy savings, improved environment  
Evanston, Wyoming*

*Following its motto, 'Student Success is Our Business', Uinta County School District #1 (UCSD #1) offers a performance-based curriculum, emphasizing rigorous standards and benchmarks. District administrators adopted these same high standards of achievement for a recent facility upgrade project designed to increase efficiency, save energy and improve the student learning environment.*

### Challenge

Having become inefficient in their operation and energy use, the outdated systems at Uinta County School District #1 facilities were in need of major upgrades. As system failures continually increased, so did repair costs. The school district sought ways to improve system efficiency to provide consistently comfortable classroom conditions and reduce high energy costs. With reductions in state funding, Uinta was also challenged with obtaining financing for the much-needed updates.

### Solution

Uinta School District #1 entered into a Performance Contract with Trane to reduce its energy and operational costs, and maintain an optimal learning environment. Under the agreement, Trane guaranteed a specified energy savings, and furnished measurement and verification services. The Trane guarantee allowed the district to leverage future energy savings to obtain American Recovery and Reinvestment Act (ARRA) funds and \$200,000 in state funded major maintenance funding.

#### Analysis validates energy-saving potential

Partnering with Wilson & Company, Uinta School District's trusted engineer, Trane focused on seven of the district's school and administration buildings. Trane reviewed building hours of operation, energy data and site lighting, controls,



*The UCSD #1 includes a high school, a jr/sr high, two middle and four elementary schools.*

equipment and water needs. TRACE® 700 building simulation software was used to model energy consumption at the facilities. Local weather data, internal building loads, occupancy information and utility costs were all utilized in the modeling. The analysis allowed Trane to validate existing energy consumed by the HVAC systems and the increased efficiency and energy savings potential of recommended energy conservation measures (ECM).

#### Boiler replacement reduces energy use

Existing steam boilers were replaced with new hot water boilers. To reduce energy usage, variable frequency drives were added to the hot water pumps and the existing heating valves were converted from three-way to two-way.

### **Lighting upgrades improve quality and efficiency**

Lighting systems were surveyed to improve their quality and reduce electrical usage. Existing T-12 fluorescent fixtures were upgraded with energy efficient T-8 lighting with high-efficiency electronic ballasts. New LED exit signs with emergency battery backup replaced fluorescent signs. Occupancy sensors were installed in gymnasiums, cafeterias and most classrooms, and vending miser occupancy controls were added to a number of vending machines.

### **Variable frequency drives match airflow to load**

To control ventilation in the gyms and cafeterias, Trane TR200 variable frequency drives (VFD) were installed on gym rooftop units. The VFD sensors provide 80 percent of maximum airflow during occupied hours and reduce energy usage when load is less than 100 percent.

### **BAS helps ensure consistent system operation**

Mechanical room controllers and sensors were replaced. Controls for air handling units, make-up air units, kitchen supply fans, hot water systems, exhaust fans and other equipment were replaced or reprogrammed.

A Trane Tracer ES™ building automation system (BAS) was installed to monitor operation of the HVAC equipment, control internal environmental conditions to ensure consistent room temperatures, record trending information and obtain alarm notifications. The BAS helps building operators to employ preventive maintenance before problems arise, rather than addressing emergency situations, saving money and resources. The web-based BAS can be used to access the systems from any computer with internet capability.



*A new walk-in cooler and freezer were installed at the district's alternative Horizon Junior/Senior High School.*

### **Plumbing upgrade reduces water consumption**

Variable flow technology was used to increase the operating performance of the plumbing systems, while meeting minimum water requirements. The upgrade helps improve system performance, reduces maintenance costs and has resulted in a significant reduction in water consumption. Pool blankets were also installed at two of the schools to reduce pool heat loss and water evaporation.

## **Results**

Using calibrated simulation and performance-stipulated consumption methods, energy use is measured and validated to help ensure continuous system performance and savings. The upgrades support the goals of Uinta County School District #1 and have resulted in an annual energy savings of more than \$190,000 per year and utility rebates of over \$125,000 at startup. Non-energy related savings are expected to reach more than \$290,000 over nine years. The upgrades have created a top-quality learning environment that will allow the district to attain its vision of preparing students to meet the demands of the twenty-first century.



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