

# Case study

August 2013



## Texas State Technical College

Upgrades provide \$344,000 energy savings, secure \$610,000 in incentives  
Waco, Texas

*Texas State Technical College (TSTC) is an independent state system comprised of four separately-accredited two-year, state-supported technical colleges. TSTC's mission is to efficiently and effectively help Texas meet the high-tech challenges of today's global economy. Nearly 30,000 students are served each year through traditional degree programs, short-term continuing education and corporate training programs.*

### Challenge

With aging infrastructure and mechanical systems, humidity control was becoming an issue in many classrooms at Texas State Technical College. A continued cycle of deferring maintenance and system upgrades led to inferior system performance and inefficient energy use. In addition, expansion plans in process would require increased mechanical capacity to accommodate the school's growth. With a strong commitment to providing exceptional value for its students, TSTC wished to upgrade its systems, keeping the campus functional while construction was in progress and creating as little disruption as possible to daily operations.

### Solution

TSTC entered into a design build agreement with Trane, a long-time trusted supplier, for its system upgrade. With an active campus and strict timing, Trane took on the risk of running the engineering/design phase of the project parallel to the construction/action phase, knowing there was no room for error, stalled issues or miscommunication. With a Trane contracting project manager leading the charge, the Trane team worked with engineering and mechanical contractors, all marching lock step to the same beat. Challenges were waiting around every corner, but through constant communication, they were quickly overcome. Communications included weekly owner meetings to review project status.



*Renewable energy was included in the upgrade, with a 100 kW solar PV system and a new roof installed on one of TSTC's classroom buildings.*

### Phase 1: Design build

A new chiller plant was designed and constructed with capacity of 600 tons and total future capacity of 2,000 tons. The existing packaged rooftop units and air-cooled chillers at three campus buildings were replaced with Trane EarthWise™ CenTraVac™ centrifugal water-cooled liquid chiller systems. The air distribution was modified to a variable air volume (VAV) system. Trane's unique approach to the central plant system enables the use of low temperature chilled water and variable flow chilled water delivery systems, as well as low temperature air and system pressure optimization technologies. The solution not only meets the college's chilled water requirements, but also allows ancillary equipment, piping, and ductwork to be sized smaller, lowering project first costs and energy consumption.

## Phase 2: ARRA funded project

TSTC applied for and received ARRA (American Recovery and Reinvestment Act) funds to complete the second phase of the project, which consisted of expanding the existing chiller capacity with an additional 600-ton chiller and associated infrastructure, and replacing DX systems at seven buildings with chilled water systems with VAV air distribution. To meet the ARRA requirement that 10 percent of the project be renewable energy, a 100 kW solar PV system and a new roof were installed on one of the classroom buildings.

## Increasing energy savings

Lighting was upgraded at thirty-three college buildings, converting T12 lights to high efficiency T8 lamps and ballasts. The existing Trane Tracer Summit® building automation system (BAS), controlling HVAC at fourteen campus buildings, was upgraded to include the new systems. Programming modifications allowed the design concepts to be implemented and the new VariTrane® VAV terminal units, Trane Performance Climate Changer air handlers and the chillers to communicate with the existing BAS. Trane as the single source for both equipment and controls provides seamless system communication.

## Results

The simultaneous design/construction upgrade at Texas State Technical College remained on budget and on time during all phases, with Trane and its subcontractors working diligently for no lost class time. TSTC received incentives totaling \$610,000 for the two phases, which included lighting retrofits at thirty-three buildings and HVAC conversions at ten buildings. Non-weather adjusted kWh consumption for the ten buildings and the central utility plant is down 25.5 percent, equating to approximately \$344,000.



*A new chiller plant with total future capacity of 2,000 tons was designed and constructed to accommodate current needs and additional growth.*

TSTC now has the systems necessary to grow, add buildings, and build in preventive maintenance. The new chilled water system and equipment have resulted in increased control; more efficient energy use; decreased downtime and costs; and a better living and learning environment for students, teachers and administration.

"The immediate response from each and every team member was second to none," said Selby Holder, TSTC physical plant director. "The design and implementation of this project presented numerous unforeseen challenges. They were able to redesign and modify the system to allow the buildings to still be utilized, as well as provide the necessary renovations to accomplish the overall savings. This project has allowed the college to actually save more funding than was originally planned, and to use those funds to implement additional changes to other buildings in the years to come. Communication was phenomenal, making our staff at ease with the renovation. I would recommend this team to any facility or organization that is looking to upgrade or renovate their facilities in a similar manner as we did here."



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