

Case study

February 2013



Washington and Lee University

*Controls system upgrade projected to provide \$280,000 per year in energy savings
Lexington, Virginia*

Washington and Lee University was founded in 1749 as Augusta Academy. In 1796, George Washington endowed the school with the largest gift ever at the time (\$20k) and the academy became Washington Academy and eventually Washington College. In 1865, Robert E. Lee became its president until his death in 1870, after which it was named Washington and Lee. Famous university alumni include Meriwether Lewis, Roger Mudd, Pat Robertson, John Warner, and Tom Wolfe. The university is most famous for its single sanction, student led honor code and its mock presidential convention, which almost always picks the non-incumbent party's nominee correctly.

Challenge

Several years ago, Washington and Lee University elected to get serious about its carbon footprint and sustainability efforts, establishing a climate action plan that called for a reduction in carbon of 20 percent by 2020, with neutrality by 2050. The administration also set goals to lower its British thermal unit (Btu) per square foot by 25 percent in four years and reduce its utility budget by \$1,000,000.

In order to achieve its aggressive goals, the university initiated plans to update and modernize the existing pneumatic controls system with a state-of-the-art direct digital controls (DDC) system. The project would include replacing the entire system in ten of the largest buildings on campus without interruption of operations.

Solution

Having experienced a thirty-five year partnership with Washington and Lee University, Trane was familiar with the university and its systems. The company was currently providing controls to over a dozen buildings on campus, and enjoyed a strong presence at the university, entrusted to perform a variety of turnkey projects.

Trane also had the ability to tie future projects into the Energy Intelligence System (EIS) recently implemented across campus to reduce energy. The EIS includes utilities



Scott Beebe, director of energy initiatives, Washington and Lee University, worked with Trane to implement a complex controls upgrade to help achieve the university's energy reduction goals.

sub-metering in more than twenty buildings with an interactive dashboard that allows users to track the amount of energy consumed to heat, cool and provide electricity to the buildings.

When Washington and Lee decided to move forward with its upgrade plans, they requested proposals from several suppliers. Trane's proposal included engineering designs and a plan of attack that would cause minimal disruption to classrooms and office space. After reviewing proposal responses, Washington and Lee awarded Trane the large, complex controls project based on a host of factors, including cost, the company's people, building systems knowledge and history on campus.

Controls upgrade increases accuracy and efficiency

To optimize energy efficiency, the existing pneumatic controls on the university's mechanical systems were replaced with accurate, reliable DDC. The extensive upgrade included pumps, hot water systems, heat exchangers, air handlers, reheat boxes, fan coils, variable air volume controls, exhaust fans and unit heaters, as well as lights, generators, and ventilation systems.

BAS provides enterprise-wide view of campus systems

Trane decommissioned the university's pneumatic controls and integrated new building automation systems (BAS) into the existing web-based, open protocol, enterprise management solution: Tracer ES™. With all building controls tied into the Trane Tracer ES, Washington and Lee can now enjoy the benefits of a single enterprise management system, including access from any computer on the network; consistent high-end graphics and user interface across campus; single source alarms; improved staff productivity; reduced training time; energy optimization; intelligent and occupancy-based scheduling and night setback; power monitoring; intelligent flow-based valve control, supply air temp reset and duct static pressure optimization.

Staff training maximizes system benefits

With the controls and BAS in place, Trane provided extensive on-site training for Washington and Lee staff. Campus walk-throughs with Trane engineers, project managers, and technicians were conducted, stopping at each building to review information on the system and its sequence of operation. Classroom sessions covered Trane Tracer Summit®, Tracer SC and Tracer ES systems and troubleshooting. The training is ongoing to help members of the university staff maximize system benefits.



With all building controls tied into the Trane Tracer ES, Washington and Lee maintenance technicians can access university systems from any computer on their network.

Results

Washington and Lee University energy consultants, ENERActive Solutions, project the campus-wide controls upgrade with Trane direct digital controls and Tracer ES building automation system will provide energy savings of approximately \$280,000 per year. Replacing the old inefficient pneumatic components with direct digital controls will make trouble shooting easier and less time-consuming for maintenance personnel. The entire campus is now viewable through a single building automation system, helping to improve maintenance staff productivity and optimize energy savings. The upgrade was completed below the university's established project budget.

"The replacement and upgrade to Trane DDC, has allowed the level of sophisticated control required to achieve the goal of Btu reduction," said Scott Beebe, director of energy initiatives, Washington and Lee University. "The ability to reduce energy consumption without compromising the comfort of our students, faculty or staff has allowed us to achieve our goals. It has been a pleasure working with the entire Trane team in making this complex project a reality."



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