Integrated, Automated Controls Support East Carolina University's Focus on Excellence

East Carolina University is a powerhouse of life-changing education. The school's motto is Servire, "to serve," which perfectly encapsulates the reason ECU has become a force for change in North Carolina and beyond. ECU's vision is to change lives and transform communities by focusing on innovation and problem solving. The University unmistakably measures its success by the accomplishments of its students and their positive impact on the world.

Located in Greenville, ECU serves more than 29,000 students annually, making it the third largest university in North Carolina. ECU offers its students more than 100 undergraduate degrees and more than 75 graduate programs, including the School of Dental Medicine and the Brody School of Medicine—a highly ranked rural medicine program

The ECU administration, staff, and faculty strive to provide their students with an outstanding educational experience—an experience that includes nationally recognized programs of study, cutting-edge research endeavors, and outstanding facilities in which to learn. A recent example of the University's

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focus on excellence was their endeavor to improve the indoor environment in campus buildings.

Challenge

ECU's main campus has two central chiller plants that provide HVAC service to campus buildings. Both systems had been plagued for many years by low delta T syndrome, excessive chiller run time, constant volume distribution pumping, obsolete controls, and other operational and control deficiencies. These problems led to uncomfortable indoor environments for students and staff, and facilities staff that were run ragged trying to fix the problems by manually overriding the systems. Add to that the high energy costs of the systems and unnecessary stress on the equipment, the situation was quickly becoming critical.

ECU hired a design engineer to develop a plan to address the problems. That effort resulted in the retrofitting of existing controls and mechanical equipment. Unfortunately, ECU saw only a loss of time and money from that effort because the problems persisted even after the retrofitting. ECU's Facilities Engineer Ray Schmit clearly describes the situation: "The systems were still unreliable and the building occupants were still unhappy. We needed a real solution."

Solution

ECU solicited proposals from qualified companies for Central Chiller Plant #1. Brady's attention to detail, expertise, and collaborative approach won them the project. "Brady gave detailed design information in their proposal, as well as an energy savings spreadsheet," explains Mr. Schmit, "important information the other bidder didn't address at all." ECU was excited about Brady's ideas on how to integrate and automate the plant controls so it would function reliably and efficiently, thereby ensuring a consistently comfortable indoor environment in the 10 buildings served by the plant.

Brady approached the project from a new perspective and integrated state-of-the-art design guidelines. The design included a new control system as well as strategic equipment modifications:

- Installation of a new Trane® Chiller Plant Manager Direct Digital Control System that integrated all of the plant's components and functions
- Complete re-sequencing of the plant
- Chiller panel upgrades to provide open-protocol integration and adaptation to variable flow control
- Cooling tower optimization to shift the load between chillers and towers based on ambient conditions and building load to realize lowest possible total chiller+tower power
- New isolation valves on cooling towers for demand-based heat rejection
- Belimo Energy Valves™ for high GPM loads to alleviate low delta T syndrome
- Motor replacements, drive installations, and differential pressure control for distribution pumps for variable-volume, demand-based pumping
- Motor replacements, drive installations, opening of Triple Duty Valves, and reduced constant speed for condenser pumps
- Installation of a dedicated 25HP side-stream filter pump in lieu of a 200HP condenser pump
- Brady Intelligent Services (BIS) analytics to verify system performance

In order to avoid system downtime, Brady scheduled the installation tasks for times when the chiller plant was lightly loaded. “Brady worked with us diligently to prevent operational issues during installation” says Mr. Schmit. This was possible thanks to Brady’s daily communication with Schmit about the work schedule, tasks, and locations. As a result, “the installation was smooth and seamless,” reports Mr. Schmit, “I was pretty much hands-off until the project was completed thanks to Brady.”

When installation and initial system setup were complete, Brady continued to optimize the system settings to meet the needs of the changing seasons. Schmit and his team received thorough training from Brady on operating the new controls, and they are now able to monitor and adjust the system from on-campus or remotely.

Results

ECU’s new integrated control system has made their Central Chiller Plant #1 the perfect example of how an effective system should perform. Students and staff in the 10 buildings served by the plant are enjoying consistently comfortable indoor environments throughout even the hot summer months. Plus, the cost to provide such comfort has been substantially reduced. Brady projected the first year energy savings would be approximately $289,000, but the actual savings were even greater at $308,841.

The facilities staff are also enjoying the benefits of the new system. “The system is finally integrated, automated, and dependable,” explains Mr. Schmit, “so no more late night calls that the buildings are hot or the chiller is down.” Schmit is also using the system analytics data to proactively investigate and address issues before they become problems. Mr. Schmit found the first year analytics so useful that Brady’s analytics service contract was renewed after the warranty period.

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Brady—providing turnkey service for the design, installation, and optimization of state-of-the-art building systems.