University of Florida Improves Laboratory Environments and Reduces Energy Costs with Siemens Solution

Located in Apopka, Florida, the University of Florida's Mid-Florida Research and Education Center is part of their acclaimed Institute of Food and Agricultural Sciences — known around the world for its teaching, research and extension activities. While the facility's laboratories were less than ten years old, UF/IFAS was concerned about high energy bills and sought to bring down energy costs while still maintaining a safe laboratory environment.

Client Objectives

Over the past decade Siemens Building Technologies, Inc. has provided Building Automation Systems and service maintenance for virtually all of the major University of Florida IFAS statewide facilities. In 2007 Kevin Heinicka, Director IFAS – Facilities Planning & Operations, and Joe Hayden, Senior Engineer, along with IFAS's consulting engineering firm Moses & Associates, Inc., expanded this relationship to include laboratory controls. Siemens was asked to replace the failed non-Siemens (Phoenix) pneumatic controllers in 22 Apopka laboratory areas with new controls to tie into the existing Siemens Building Automation System.

Siemens Solutions

The existing laboratory air valves were old-style venturi designs, married to pneumatic actuators that made for inherent inefficiency. Airflow was either a constant 100% or 60%. There was no provision to reduce air flow, even if a fume hood sash was in the down position. Nor was there any way to measure air flow.

Siemens, in collaboration with IFAS Facilities, developed a unique solution for IFAS that turned the existing air values into modulating valves through interface with Siemens electronic actuators and lab room controllers. This allowed for variable air flow volume, and the ability to schedule automatically timed night setbacks. Occupancy sensors were also installed so if labs were unoccupied during a time they were normally scheduled to be occupied, air flow volume would automatically reduce to a minimum.

The retrofit system was able to restore and maintain the original design specifications for each laboratory; maintaining employee safety with the new variable flow rates. The installation includes:

New sash sensors for the existing fume hoods, including operator display panels providing face velocity in feet per minute and low velocity alarms. Fume Hood Controllers sense and manage the fume hood exhaust. The operator display and alarm panels on the face of the fume hoods provide indication to instructors and students regarding safety. Occupancy sensors signal when the lab space is unoccupied to enable the system to reduce air flow and energy use. When users return, the low flow rates increase to the rates needed for proper protection.

Two general lab area controls, with added provisions for:

- Air flow measurement for each of the supply air values, general lab exhaust and fume hood valves, providing more accurate control for safety and energy savings.
- Lab electronic actuation for fume containment and rapid air flow tracking to maintain direction airflow in the pressurized rooms.
- New lab room controllers at the supply air valves along with electronic discharge duct and room temperature sensors enable additional energy savings through the use of variable volume cooling control in the occupied mode. The previous constant volume mode had significant periods of simultaneous cooling and heating. This also allowed for a Siemens special BTU compensation application to be used on the lab reheat coils for additional heating savings.

Four exhaust air fan sets, each with two fans. These were retrofitted with new electronic bleed damper actuators, current-sensing relays for status, and damper-end switches for damper positioning sensing. While the constant speed fan motors provide fixed stack discharge velocities 7x24, the bleed damper is modulated to control the static pressure for exhaust air valves connected to each individual fan set. This sequence provides smooth, repeatable performance from the air valves while maintaining exhaust velocity.

Client Results

UF/IFAS was able to immediately see reductions in energy and operational costs. "Over seven months we've already reduced our energy costs by over 22% total," says Heinicka, "including a 21% reduction in electric kwhs and 11% in natural gas therms. That translates to annual savings of about $102,000 for the first year of the project. It's going to pay for itself in less than two years, which is a really, really good ROI." The staff was equally pleased with Siemens' overall performance; Hayden notes "we had a good support team from Siemens that worked closely with us to make this application work. I've told other Universities in the area who've called for information that I'd do it again." And the potential for other University laboratories to do what's right for the environment is vast; according to Heinicka "my guess is there are as many as 100,000 laboratories nationwide with older valves that could be replaced or retrofitted with Siemens lab controls, and it's incredible how much energy could be saved."

Siemens Building Technologies
1000 Deerfield Parkway
Buffalo Grove, IL 60089
Tel: (847) 215-1000
Fax: (847) 215-1093

www.usa.siemens.com/
buildingtechnologies