

# Cornell University Biotechnology Building

Logical Control Solutions Inc. / Automated Logic Corporation

## Laboratory Breakthrough! Energy Savings in Biotechnology Building Approaches 30%

### The Challenge

- Reduce energy costs through conservation measures and installation of effective building automation system
- Improve safety (toxic exhaust alarming capabilities) in building labs
- Replace unsafe, outdated and ineffective pneumatic controls
- Maintain ongoing laboratory operations during retrofit project

### The Players

Cornell University's Biotechnology Building may be home to advanced scientific research, but its building automation system was far behind the times. Built in 1986, the energy-intensive facility continued to operate with its original pneumatic controls in occupied spaces plus first generation DDC controls on the central system well into 2004. The inefficient pneumatic controls required costly maintenance; pressurization controls were not reliable; and air flows were excessive. Of particular concern: there was no remote monitoring of fume hoods and room controls.

Automated Logic's WebCTRL® was selected for the project following its record of performance in the University's Nanoscience Building. There, the combination of WebCTRL's hardware and native BACnet® capabilities successfully supported energy control strategies advanced by Cornell and the New York State Energy Research and Development Authority. University officials also cited WebCTRL's ease of use and dealer support.

The Biotechnology Building project was overseen by Lanny Joyce, P.E., Manager, Engineering, Planning and Energy Management and head of the campus-wide Energy Conservation Initiative.

### The Solution

"We had a lot of fun setting up that building," Joyce remarked. With technical and custom graphics support from Logical Control Solutions, Joyce's Department of Utilities and Energy Management partnered with the University's HVACR shop which designed, programmed and installed the system. A total of 90 labs were outfitted with Phoenix Controls VAV fume hood sash position controls and venturi-style VAV boxes, digital room controllers, reheat valve transducers, room occupancy sensors and user-adjustable networked thermostats. Another 100 non-fume hood labs were retrofitted with box-mounted Automated Logic controls, room occupancy sensors, thermostats and reheat controls.

"With WebCTRL's ease of programming, we were able to commission three to four fume hood labs over an eight-hour shift," Joyce noted. And because the labs needed to remain operational in the 24/7 facility, most of the work was completed overnight.

Results following the installation were both immediate and dramatic. "Our control strategy was to minimize air change rate in the room to what was necessary to keep it comfortable and provide a safe working environment," Joyce continued. "We were able to cut the minimum ventilation rate in half when a room is unoccupied, and we relaxed unoccupied setpoints from  $\pm 1.5$  to  $\pm 3.0$  during scheduled occupied hours and to  $\pm 6.0$  during unoccupied hours. On an annual basis, that's a big energy savings." University officials also launched an energy savings and



Lanny Joyce, P.E., Manager,  
Engineering, Planning and  
Energy Management



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Dave Roman, Project Engineer (left);  
Ron Hurd, Field Engineer

lab safety program for building users, encouraging them to close VAV hoods when not in use. Combined with the WebCTRL retrofit, efforts have saved nearly \$350,000 annually in building energy costs.

"When we put the project together, we made estimates of our energy savings," noted Project Manager Alan Hebert, E.E. "Our prediction at the time was about 30% annually with Automated Logic controls and other energy conservation improvements. We're very close to the 27-28% range, and we'll probably exceed the 30% savings we had estimated."

"WebCTRL provides a higher level of programming sophistication, and at the same time, it's much easier to use. The ease of creating and displaying trends, and of doing analysis from the

trend data, allows us to verify the performance of all the algorithms we put into a building," Joyce added.

"WebCTRL fit into our larger BACnet communication scheme at the University and tied in very well to our 24-hour operation for central alarm repository," said Dave Roman, Project Engineer. Added Ron Hurd, Field Engineer: "WebCTRL's tools are perfect for tracking energy consumption from long-term data storage. The tools are superior."

In addition to those colleagues, Joyce credits Jim Obrien, HVACR shop Construction General Foreperson, and Cornell's HVACR, electric and sheet metal shops for the successful outcome.

"It was a fantastic job, a real team effort," he said. "And the technical support we get from Logical Control Solutions and from Automated Logic's corporate office is key to our success with these products." With the Biotechnology Building operating more efficiently, WebCTRL installations are underway or planned for a number of additional facilities on campus.



Alan Hebert, E.E.  
Project Manager

## Project Summary

Savings:	\$350,000 per year (approx.), 27%-28% total energy savings
Location:	Cornell University, Ithaca, NY
Project Type:	Retrofit
Building Size:	150,000 square feet
Building Usage:	Biotechnology research
Objectives:	Reduce energy use and costs, improve building safety
Design Considerations:	Interoperability with existing systems and equipment
Major Decision Drivers:	Custom programming and trending capabilities; available memory; speed of communication; ease of use; success of other campus installations
Energy Study and Design:	M/E Engineering P.C., Rochester, NY; <a href="http://www.meengineering.com">www.meengineering.com</a>
Controls Contractor:	Cornell Planning, Design and Construction; HVACR Shop
Controls Dealer:	Logical Controls Solutions, Inc., Rochester, NY; <a href="http://www.logicalcontrolsolutions.com">www.logicalcontrolsolutions.com</a>
Installation Date:	2005



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