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Hudson High School

Delivering savings through greater efficiency

Solution Partner

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Achieving Educational Excellence With Greater Comfort

Improving a problematic temperature control system in the district's high school paves the way for enhanced comfort, greater energy efficiency, and significant savings.

Hudson, Iowa, is a progressive, growing suburb of Cedar Falls and Waterloo. In the summer of 2009, the Hudson Community School Board approved a major project upgrade, renovating the high school's original DDC system with the expert help of their local Siemens Solution Partner.

Client Objective

The building's original 12-year-old HVAC system was barely functioning. Faulty and unpredictable, it not only created a less than desirable learning environment, but made troubleshooting of mechanical or controller problems extremely difficult — costing hundreds of thousands of dollars in wasted time and money over the years.

A Siemens Solution Partner — with decades of experience in improving building performance — was selected for the job. The project began in early July, with the need for completion by late August, before the return of the high school's 286 students.

Siemens Solution Partner Solutions

The Siemens Solution Partner proposed the open TALON with BACnet Building Automation System for this 60,000 sq. ft. facility that features 25 classrooms, a multipurpose room, media room, auditorium and gymnasium. TALON with BACnet enables smooth integration with

other systems, creating more integration flexibility than any other system on the market.

The TALON system, created to improve every aspect of building automation, would provide the school with the best integration of today's technology and keep it open for future technology and new products.

The Best Total Solution Approach

TALON seamlessly linked into the high school's existing infrastructure, giving budget-conscious administrators an immediate appreciation for its cost-effectiveness. Its integration power, open architecture and BACnet software made the TALON system a smart investment, one that will continue to pay the school district back for years. Future system integration opportunities include HVAC, lighting, power, process, fire/life safety, and security/access control.

Since TALON makes the necessary connections between systems, it can link the entire district, managing multiple buildings as a whole, and not as separate

systems — all from a single workstation. The system can be monitored and controlled from any web-enabled device, maximizing staff productivity and building performance and minimizing any disruptions to events inside the facility.

Top Honors For High-Performing Control System

Following the completed work, Hudson High School boasts a state-of-the-art, fully integrated building automation system that incorporates DDC for energy management, equipment monitoring and control.

During start-ups, the Siemens Solution Partner found mechanical issues from failed actuators on firesmoke dampers, failed compressors in the heat pump system, burned up motors on exhaust fans, and failed fans. The old, ineffective DDC system wasn't indicating mechanical failures or maintenance issues, making it hard to know what was broken and where it was located. Today, the TALON system monitors and manages through front-end Tridium graphics, communicating visually any



specific mechanical failure, as well as scheduled preventative maintenance reminders. When a failure occurs, the maintenance staff receives text messages to their cell phones with immediate response required.

With their upgraded system, the high school's facility managers will now be able to better schedule their building, implementing key energy saving opportunities such as turning off air exchange systems in unoccupied rooms, reducing lighting, or simply shutting off equipment when not in use. Through the Internet, the building is immediately optimized by the click of a mouse. Whether it is scheduling night setback temperatures or shut down for summer, the district is expecting to see a big upswing in savings.

Classrooms Making the Grade

New and reprogrammed thermostats have corrected the building's sequencing problems, keeping each room a very comfortable and consistent 72 degrees F. Front-end monitoring graphics and sophisticated occupancy sensors helped

facility managers conduct advanced occupancy testing, determining a 20% electrical cost savings in the room monitored by an occupancy sensor. These successful results are leading to implementation of more sensors in the auditorium and cafeteria.

The gym and auditorium had a shared heat pump system that would switch heat pumps to the space with the most load — a system that never worked properly. As a result, concerts or other events in the gym were notoriously uncomfortable. After the TALON upgrade and some sequence changes, the system was rebuilt to accommodate the schools needs, creating a very comfortable auditorium for concerts and a more pleasant gym when required.

Measuring Success Through Cost-Savings

This project was financed with money saved in the building fund, protecting the district's operating fund and allowing the Board to meet prioritized needs and remain responsible to local taxpayers.

The Siemens Solution Partner was able to reuse all of the sensors and wiring so as to

minimize what would need to be removed and discarded, saving on materials and supporting sustainability initiatives.

With the upgrade, the building has become more energy-efficient, upgrading from a poorly controlled, uncomfortable facility to a pleasant, well-monitored environment that is easier to diagnose and maintain. Tighter scheduling, reduced setpoints, and easier system access have given facility managers the ability to control their utility bills and reduce costs. In addition to the comfort the new system is providing, it is anticipated that there will be significant cost savings as the system regulates temperatures and reduces energy.

The improved control system at Hudson High School has successfully impacted the learning environment, the bottom line, and the building's most important function: providing a comfortable learning environment for children and teachers.

The Siemens Solution Partner will continue its work on other buildings in the district by identifying cost-effective and energy-efficient upgrade opportunities that optimize building performance.



The improvements made by our local Siemens Solution Partner to our high school control system have paid immediate dividends for the district. Primarily, we are able to monitor and adjust the temperatures of the rooms in an easy, convenient manner. Secondly, we are able to adjust temperatures when the rooms are not in use in such a way as to save energy and money, which can then be put to use back in the budget for educational purposes. Therefore, the system has helped us create a consistently comfortable learning environment, while at the same time allowing us to invest more dollars in students' education; a win-win for all!

—Roark Horn,
Hudson Community Schools Superintendent

Completed System Features

The TALON Building Automation System with BACnet

Improves all basic building automation tasks, including maximized energy efficiency, productivity and system management.

TALON is advancing building automation:

- Pre-installed drivers that simplify integration to nearly any existing or new building system
- Simple user interface and easy-to-use software
- Specialized training for Siemens Solution Partners to ensure you get the most out of your building
- Uses an open protocol language to allow multi-system communication

TC16 Compact Controller

The TC Compact features a DIN rail for easy installation as well as dense I/O controls. TALON TC Controllers are designed to contribute to sustainability strategies. They are compliant with all major industry standards by meeting the requirements of RoHS, Halogen-Free, Blue Angel, TCO '99 and Nordic Swan Housing Material standards; made of non-toxic components; have the maximum allowable recycled content; and use soy-based inks for labels.

TEC Heat Pump Controllers

The BACnet Terminal Equipment Controller (TEC) provides high performance direct digital control (DDC) technology for room temperature control of heat pumps. It can operate as a standalone or can be networked to perform complex HVAC control, monitoring and energy management functions. BACnet TECs are lead free and meet the European Unions' Restriction of Hazardous Substances (RoHS) compliance. Terminal markings are laser printed to save on paper and ink usage.

WCIS Commissioning/Programming Tool

The WCIS Tool was used to configure the controllers. It instantly detects wiring problems and bad components, **enabling the start up of 60 heat pumps in just three 3 days!**

Tridium Niagara AX

Using Tridium AX front end TNM6, the Siemens Solution Partner built custom graphics and floor plans to help manage system performance in real time via the Internet. Browser-based displays communicate system visuals to a wide range of devices including PCs, PDAs and smart phones.

Through innovative software updates and powerful hardware, the school is utilizing the best technology of today, and ensuring a maximum return on their investment with a system that's ready to achieve maximum efficiency well into the future.



Before the implementation of the new Siemens controllers, our HVAC system was barely functioning. In a 12-year-old building it was EXTREMELY difficult to troubleshoot mechanical vs. controller problems with the original system. The amount of time and money wasted on troubleshooting alone over time resulted in the hundreds of thousands of dollars. Since the install of the new controllers, I can visually look at the system through any Internet connection from anywhere in the world. Being able to control total room atmosphere by the click of the mouse has cut down on complaints as well as the time and energy saved by the new system. Lastly, the amount of money we have saved by being able to determine if it is a mechanical failure vs. controller has probably been the greatest advantage of the new system. The expertise of our Siemens Solution Partner made this an awesome transition for Hudson Community Schools. They have worked tirelessly on this project and answered any questions immediately. I have had times when the system text messages me or emails me that a heat pump loop is high. As I am reading the message they are calling me to tell me what is probably wrong. I investigate the issue and they are always right!

—Kevin Murray,
Technology Coordinator, Hudson Community School

Smart Service, From Engineering to Ongoing Maintenance

With the backing of a leading manufacturer, Siemens Solution Partners are able to offer the best products and service -- now and in the future.

- Energy-saving and cost-efficient HVAC products — a complete range of reliable and long-life temperature, humidity and CO2 sensors, valves and actuators, damper actuators, and variable frequency drives provide state-of-the-art control
- Fast commissioning, installations and long-life dependability that reduce costs
- Environmentally friendly products — Siemens has voluntarily incorporated environmental practices into many of their manufacturing and packaging processes

At Siemens Building Technologies, We Teach by Example

As a global leader, Siemens has set initiatives to produce products from environmentally friendly materials. This includes using less materials in our product manufacturing, packaging and labeling, using the maximum amount allowable of recycled materials in product manufacturing and packaging, and eliminating tin-plating in all materials. Not only are we helping thousands of customers improve the efficiency of their buildings and operations every day, we are also working hard to ensure our company and our people are doing the same.

Siemens Industry, Inc.
Building Technologies Division
1000 Deerfield Parkway
Buffalo Grove, IL 60089-4513
USA
Tel. 847-215-1000

Siemens Building Technologies, Ltd.
2 Kenview Boulevard
Brampton, Ontario L6T 5E4
Canada
Tel. 905-799-6649

www.usa.siemens.com/talon

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