

# Case study

# Broward County School District

Broward County, Florida



## Major school district takes aim at reducing energy consumption

Broward County Public Schools is the sixth-largest public school district and the largest, fully accredited public school district in the nation. Focused on reducing its energy consumption and utility budget, the district engaged Johnson Controls in a performance contract to make energy saving infrastructure improvements at select facilities. The improvements are designed to provide operational savings of more than \$18 million over the life of the contract.

Broward County serves the educational needs of a unique urban/suburban mix of more than 250,000 students at more than 260 facilities district-wide. While the district has built many new schools in recent years, it must maintain an aging infrastructure associated with a very large base of older facilities. In addition, the district is faced with rising utility costs and reduced budgets.



Utility savings recommendations included the use of thermal storage plants at five schools.

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**JOE FELLMETH**  
**PROJECT MANAGER**  
**BROWARD COUNTY PUBLIC SCHOOLS**



Coral Springs High School is one of more than 25 schools involved in the performance contract.

In 2000, the district engaged the services of four energy service companies, including Johnson Controls, in performance contracts for infrastructure improvements aimed at reducing energy consumption and utility costs. "We saw performance contracting as a means to make infrastructure upgrades at more schools much more quickly and cost effectively than we could have otherwise," says Joe Fellmeth, project manager for the district. "We're also able to take advantage of the operational savings that come with those improvements sooner, rather than continuing to spend more on utilities," adds Rob Jindracek, manager of energy conservation/utility management.

## A phased approach to savings, improved academic environment

After responding to the district's request for proposal, Johnson Controls was awarded the first phase of a performance contract for improvements at eight schools. "Johnson Controls was awarded the first phase because of their qualifications, including the strength and depth of their technical audit and proposal," says Fellmeth. "Proven results, and exceptional performance after the sale is what has lead to an additional three phases to-date, involving more than 25 facilities." Additional phases will be awarded until infrastructure improvements have been made across all facilities.

As each phase is completed, the next batch of schools is audited to identify improvements that will have the most impact on savings through reduced energy consumption, while also improving the academic environment. "We rely on Johnson Controls to take a holistic view of the facilities to identify both short- and long-term opportunities," states Fellmeth.

Improvements under the contract include occupancy sensors for lighting, lighting retrofits, chiller and pump upgrades, and installation of air handling units and variable frequency drives. Low flow plumbing fixtures and irrigation controls help to conserve water. Building management system installations and upgrades improve monitoring and control of HVAC equipment. Other improvements include window tinting, indoor air quality modifications, trash cost reducing devices and behavior modification initiatives.

Unique to the Johnson Controls utility savings recommendations is the use of thermal storage plants, which make ice at night when utility rates are lower. The ice is then used for cooling during the day, avoiding the use of mechanical cooling equipment. "Thermal storage was a technology that we were very interested in pursuing. Johnson Controls identified opportunities where it could be utilized and had the technical expertise and contracting abilities to make it a reality," says Fellmeth. Johnson Controls identified five schools with cooling equipment capable of temperatures low enough to make ice, enough load to make the shift feasible, and enough room in the building footprint to add the storage units.

"This is an example of how Johnson Controls is taking advantage of more than just the low hanging fruit when it comes to utility savings. It's an impactful solution that goes beyond the usual suspects," says Jindracek. "One component of the local utility's electrical rate is based on peak electrical demand in a given month. If thermal storage plants do not operate as originally planned on a consistent basis, the district will not garner the financial benefits as predicted. We are proud of the near perfect performance of our systems in meeting our demand targets, which is a testament to Johnson Controls Metasys® building management system and the original engineering of the thermal plants," adds Fellmeth.

The Metasys system is used in select facilities to maximize the efficiency of new HVAC equipment installed under the contract.

Utility rebates expected by the district, including those generated by the thermal storage plants, account for more than \$692,000 of the overall operational savings. Johnson Controls guarantees the operation of the thermal storage plants so the district doesn't have to worry about the mechanical cooling equipment kicking in.

## Measurement and verification ensures, enhances savings

A Johnson Controls performance assurance specialist (PAS) provides measurement and verification services to ensure the savings are met, while looking for additional energy saving opportunities. Maintenance of installed equipment and controls is also provided by Johnson Controls over the life of the contract.

"Johnson Controls excels in its measurement and verification services. I feel they are working with the district toward a common goal. The PAS is very proactive, informing me of things such as load profiles that are out of line and identifying the source of the problem so we can address it quickly," states Fellmeth. "They have even recommended and subcontracted enhancements to their competitor's building controls systems to allow for more effective measurement and verification."

Through utility bill comparison, the Johnson Controls PAS is able to spot inconsistencies and spikes in the district's energy consumption that indicate other problems such as equipment running during off-hours when it is not needed. This tracking is an added value to the district, which has helped identify additional energy saving opportunities.

For Jindracek, having a partner in the district's energy conservation efforts is key. "Johnson Controls has saved the district more than what is required by the contract. Not only through accurate measurement and verification but by going above and beyond their obligations to find additional energy saving solutions that benefit both partners," he says. "Our goals are aligned and this fosters a better long-term relationship."

## Relationship brings benefits beyond savings

Decreasing utility costs is a primary focus for the district but it cannot be at the expense of the academic environment. "The improvements we're making to the facilities and equipment have an immediate impact on the learning environment because they improve operations and building performance. This is especially true of the lighting retrofits on which we've received very positive feedback from faculty and staff," says Fellmeth.

In addition, reducing utility costs is in line with the district's commitment to environmental stewardship. "We have a duty to be environmental stewards and set an example for the community. We're doing this by making an impression on students who then take the information home to their families," explains Fellmeth. With Johnson Controls help, the district provided lists of energy saving ideas to every school. When students at the district's South Plantation High School conducted an energy audit of their building, Johnson Controls provided a guide for the students and later compared the results to their own.

"Our Johnson Controls account manager has presented the district's energy initiatives at career days, participated in an environmental program at one of our magnet schools and demonstrated the benefits of various alternative energies to our Science Club," notes

Fellmeth. "We have high expectations of the Johnson Controls team and they continue to meet them," adds Jindracek. "They are always there to help us, not just when they are obligated to. And, they continue to bring new opportunities to our attention, such as alternative energy solutions."

The most recent phase of the performance contract with Johnson Controls includes the installation of a 5kW solar array. The array will serve as an educational tool and provide a source of renewable energy for a new science building at South Plantation High School. The school has a Science Magnet Program, which includes renewable energy studies.

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**ROB JINDRACEK**  
**MANAGER OF ENERGY**  
**CONSERVATION/UTILITY MANAGEMENT**  
**BROWARD COUNTY PUBLIC SCHOOLS**



Joe Fellmeth, Project Manager and Rob Jindracek, Manager of Energy Conservation/Utility Management with George Green of Johnson Controls (center), inspect the YORK chiller plant at South Plantation High School.

# Securing the academic environment

Crimes against children, such as the 2005 abduction and murder of Jessica Lunsford in Homosassa Springs, Florida left no doubt about the importance of safety and security at school facilities. As part of a comprehensive safety and security program, Broward County Public Schools enlisted Johnson Controls to install a district-wide visitor management system dubbed, the Security Tracking and Response (STAR) System. The system allows the district to share data, monitor, identify, and screen visitors to more than 250 school district properties.

Johnson Controls teamed with Security Identification Systems Corporation to customize its existing software platform to meet the district's requirement for all schools to have real-time access to the National Sex Offender Database, as well as state and local law enforcement databases. In addition, the district is able to develop and manage its own database of people, other than criminals, who should be denied entry for specific reasons; and cross-reference students against parents and others authorized to pick up children during the school day.

The STAR system allows personnel to process visitors with minimal delay and inconvenience by scanning the required form of identification, which is instantly checked against the various databases and a badge issued for approved visitors. An online component allows visitors to pre-register. If approved, their badges are waiting for them upon arrival. If a "denied" visitor is identified, attendants can instantly alert district police via an email and text message with a click of a mouse.

Attendants can also send instant district-wide emergency messages like Amber Alerts and hurricane warnings to every workstation in the network simultaneously. A separate database of more than 35,000 volunteers allows school personnel to more easily manage the volunteers' activity. Staff can search the volunteer database for specific skills and interests, times available and automatically tabulate service hours at particular sites.

For Broward schools, the STAR system met immediate goals to better safeguard students, faculty and visitors, while fulfilling the requirements of Florida's Jessica Lunsford Act; which is designed to shield students from sexual predators. While already comprehensive, expandable workstations that can include hardware for biometrics and the application of radio frequency identification, among other technologies, means the STAR system has flexibility to grow with the district's needs.



The Security Tracking and Response (STAR) System is used to screen visitors to more than 250 school district properties.