

Finding Funding: Making School Improvements Possible

By Jim Simpson

Green Bay Packer coach Vince Lombardi is quoted as saying, “Winning isn’t everything, but wanting to win is.” Whether it’s a major university or an urban school district, pulling together and developing a plan and being confident in the financing through performance contracting is the best way to meet student, taxpayer and community needs.

Considering sustainability projects for your school or campus is like giving a kid a toy catalog. It’s easy to be captivated by all the glossy pictures of solar panels and fancy new lighting fixtures. But when it comes time to think about the bill, many facility planners often sigh and just forget about it.

They’re not alone. A survey of almost 1,700 business decision makers for companies and institutions in North America, the Johnson Controls Energy Efficiency Indicator, found that money issues form the biggest barrier to energy efficiency. Some 81 percent of institutional respondents noted that insufficient internal budget is the top financial barrier.

The good news is that educational institutions actually have several options to choose from when it comes to financing. Perhaps the most interesting is performance contracting – a procurement tool that allows schools to leverage the savings they get from improving buildings in order offset the costs of the projects themselves. The approach brings many benefits:

- The savings from energy and operational costs can be used to fund items such as environmentally friendly technology and student engagement.



Wyandotte Schools Case Study Picture

- The process provides access to capital when budgets are limited or revenue is low.
- There’s a legal contract stating that the savings will materialize over the lifecycle of the investment.
- Schools have access to specialized technical skills and innovative approaches beyond energy or water to include security and other technologies.

The turnkey approach means that facility managers who often don’t have the time, expertise or manpower to oversee comprehensive facility retrofits have an accountable way to get the work done with minimal direction and minimal disruption to the school or campus.

Wyandotte Public Schools

For instance, planners in the Detroit suburb of Wyandotte, Michigan were proud of their schools

Measure to Manage

To install confidence in a project, all performance contracts contain some form of measurement and verification. By following an international standard, ESCOs develop a benchmark for a project's savings, then compare energy use before and after the project. The options provide a range of approaches depending on the characteristics of the project balanced with accuracy and cost.

- **Option (A) Retrofit Isolation: Key Parameter Measurement** – Savings are determined by measuring some of the key performance parameters which define the energy use of the energy conservation measure's affected systems in relation to the success of the project. When those measurements are not available, estimates are determined with specific documentation based on historical data, manufacturer's specifications, or engineering judgment.
- **Option (B) Retrofit Isolation: All Parameter Measurement** – Savings are determined by measuring all key performance parameters which define the energy use of the specific ECM-affected system.
- **Option (C) Whole Facility** – Savings are determined by measuring energy use at the whole facility or sub-facility level.
- **Option (D) Calibrated Simulation** – Savings are determined through simulation of the energy use of the whole facility, or of a sub-facility.

For more information, see <http://www.evo-world.org/>

but knew they needed to develop safer, state-of-the-art facilities for its 4,700 students. With tough economic times and low state funding, there was no money and little hope in asking taxpayers for much-needed improvements.

To make the project affordable, the district and Johnson Controls entered into a series of performance contracts designed to provide energy and operational savings that would pay for the upgrades and renovations. The sustainable improvements included:

- Replacing old lighting with new energy-efficient fixtures.
- Installing photovoltaic solar panels.
- Using solar energy instead of boilers to generate hot water at the high school and middle school.
- Deploying the Metasys® building management system to monitor and optimize all building systems.
- Installing a rainwater capture system in the high school.

The project also reduced the schools' computer costs by turning lab computers into servers to which multiple monitors, keyboards and mice could be connected. This approach let Wyandotte eliminate six of every seven lab computers, which helped save energy in the schools and decrease equipment replacement costs.

Savings under the performance contracts are estimated to be \$6.9 million over a 15-year period, which means Wyandotte can fully pay for improvements to classrooms and facilities. The contract also included grant writing support, which led to solar project funding of \$50k from State of Michigan Energy Office. Most importantly, the district now offers all of its students and faculty exceptional learning environments that are conducive to academic achievement.

Performance Process

Each project is different, based on the budget, size and preferences, but

here's how performance contracts generally work:

- The school or institution contracts with an energy service company (ESCO) to develop an audit of the energy and water use for the district or campus.
- The ESCO identifies Energy Conservation Measures (ECMs) based on their ability to save utility costs and operations & maintenance expenses.
- A preliminary business case and cash flow are created to substantiate the ECMs' economic benefit and environmental impact.
- The district reviews the business case and selects those ECMs to be included in the project.
- The project is fully engineered by looking at capital, installation and operating issues.
- A project-specific methodology is established for each ECM to measure and verify the savings.
- The ESCO determines the expected outcomes and develops a contract to fund any savings shortfalls.

As concerned as campus trustees and school boards may be about financing projects, they're even more worried about risk management. How can they be sure these big projects will actually work and they won't be stuck with a bill or equipment that doesn't work?

It's the measurement and verification (M&V) component of performance contracts that make them so attractive. International standards (see sidebar) provide assurance and a rationale for the performance of the equipment installed.

Beyond Energy in Buffalo

Building owners are looking at performance contracts for elements other than just energy and water. Buffalo Public Schools wanted to improve its energy efficiency level, but

it also wanted to improve student and staff security issues at its schools. A \$1.4 billion, district-wide project was aimed at modernizing its 65 facilities and creating more safe and secure academic environments for the 37,000 students and staff.

The project included a multi-phase performance contract with Johnson Controls that guarantees positive cash flow of \$20 million over 20 years for the district. While the state supported the modernization plan with a 93.7 percent building aid reimbursement rate, performance contracting was the district's financial solution to achieve the remaining local share of the funding.

Using a multi-phased approach, Johnson Controls focused on key instructional and operational needs first.

- **Phase One** - Lighting retrofits, HVAC equipment and controls upgrades, building envelope improvements, steam traps, insulation, pool covers and installation of a Metasys® building management system at select schools. An initial security project included installing Johnson Controls IFC-3030 fire alarm system and a P2000 security management system, IP

video surveillance, HID card readers, clocks, bells, public address, auditorium sound systems, temperature controls and a master antenna system for nine schools.

- **Phase Two** - Expansion of the Metasys system, lighting retrofits, replacement of burners, boilers and steam traps, installation of boiler controllers and new interior storm windows at an additional 13 schools.
- **Phase Three** - Expanded the initiatives to an additional nine schools and begin the district-wide security upgrade.

Security for All

The district wanted to focus on improving student and staff safety and deterring break-ins at all facilities. Through a district-wide technology and security project, Johnson Controls set out to bring as much visibility of facilities as possible to the District's administrative and security staff.

The project included the installation and integration of nearly 4,000 video cameras in schools, district-wide, which will be strategically

placed to provide maximum visibility to major public spaces. A Johnson Controls Digital Vision Network system is used for recording, archiving and retrieval of all activity captured by the cameras.

The main offices at each school are equipped with 42-inch plasma monitors so camera activity can be viewed in real time. The monitors provide visual identification of school visitors before they are allowed to enter a monitored door. A district-wide burglar alarm system is integrated so if an alarm is triggered, cameras automatically train on the door or window alarm point so the activity can be recorded.

Johnson Controls supports all installed equipment and controls under a service agreement, which includes an onsite building environment specialist and comprehensive training. The renovation project resulted in an Outstanding Achievement Award in Public/Private Partnerships for the city from the United States Conference of Mayors.

Higher Education Benefits

An increasing number of colleges and universities also are using performance contracts, especially as they work to attract students interested in green careers and the sustainability of their own campuses. For instance, Mt. Hood Community College (MHCC), in Gresham, Ore., serves more than 31,000 students each year, with more than 70 associate degrees and certificate programs in a wide variety of disciplines.

Through a partnership with Johnson Controls, MHCC is providing a more efficient, reliable and comfortable learning environment to students and staff with an energy savings program that is anticipated to reduce the school's carbon footprint and energy costs by more than \$760,000 each year.

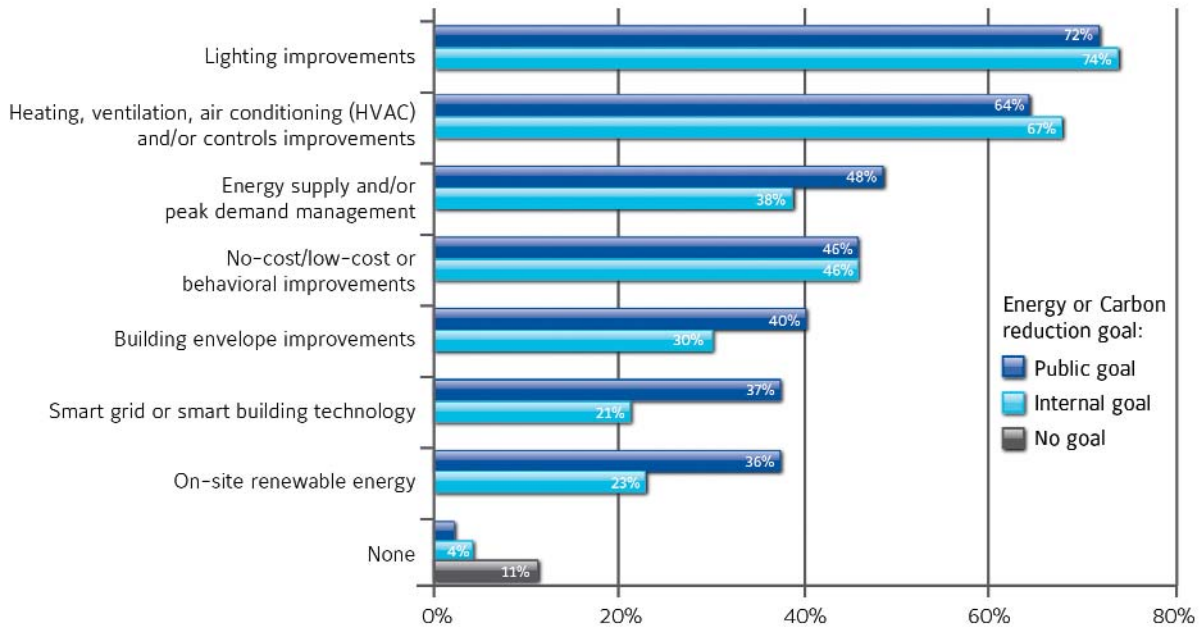
Central Utility Plant on Brink of Disaster

The spectacular natural surroundings of the campus in the foothills of the Cascades were in stark contrast to a 40-year old central utility plant that was on its last legs after fires and decades of



Buffalo Public Schools

Which of the following energy efficiency measures has your company/organization adopted in the last 12 months? (Select all that apply.)



deferred maintenance. Although the school did its best, it couldn't pass a bond issue, and budgeted funds were eaten up with emergency fixes.

Through a state-approved performance contract, MHCC developed an approach that uses utility savings to offset \$10.7 million in improvements over 17 years. Additional funding for the project was secured through tax credits from the Oregon Department of Energy and the Energy Trust of Oregon.

After an extensive audit - which found potential for saving more than half the campus energy bill - Johnson Controls embarked on a comprehensive rebuild of the central utility plant. It was completed on budget nearly three months earlier than a typical six-month implementation with minimal impact on the occupants.

Campus Wireless and Water

Improvements also include the installation of the Metasys® building management system, which provides efficient building controls to link the entire campus wirelessly - one of the largest arrangements in the country - and ensure better indoor air quality.

Additionally, a smart irrigation system conserves water usage, a solar

thermal system helps heat the school's three pools, and low-flow fixtures save water throughout the buildings. Other green features include extensive recycling, improved lighting in gyms and classrooms - and perhaps most visible, funds for a low-energy Smart Car for security officials.

The improvements are projected to reduce annual carbon emissions by more than 3,000 metric tons, equivalent to the annual amount of electricity used in 287 homes, as well as the carbon sequestered from 233 acres of pine forests per year. The work also created hundreds of jobs, ranging from engineers and architects to skilled trades and construction.

Setting Goals

Beyond performance contracts, educational institutions and school districts can explore other funding options, such as bank loans, bonds and capital, operating or tax exempt leases. No matter what, the first step is setting a goal. The Johnson Controls Energy Efficiency Indicator results show that companies and institutions that set a public goal for reduction - or even an internal target - actually end up saving more. ■

Jim Simpson, Director, Higher Education Energy Solutions, North America Johnson Controls, Inc., heads up a team of sustainability and energy efficiency experts in the higher education market. His team is responsible for developing and deploying the technologies and expertise surrounding all of Johnson Controls' Solutions offerings including performance contracting, water efficiency, renewable energy, security, and sustainable construction. Before joining Johnson Controls in 1994, Jim held several sales and leadership positions with Honeywell. Jim joined Johnson Controls as a branch manager in San Antonio, Texas. Since then Jim has held various leadership positions, such as regional sales manager, area general manager, and regional vice president. Jim has a consistent track record of bringing increased value to customers through innovative offerings such as the bundling of services with technologies, creating new energy efficiency measures, incorporating student engagement, and increasing quality in the delivery and installation of projects. He is a member of National Association of College and University Business Officials, American Council on Education, and National Association of State Facility Administrators. A graduate of Texas A&M University, Mr. Simpson has two children and resides in Houston, Texas.