

Case study

Johnson Controls Brenzel Technology Center

Milwaukee, Wisconsin



Working showcase teams energy efficiency with productivity

Johnson Controls, Inc. is a world leader in creating and managing quality building environments – ones that are safe, comfortable, productive and efficient. As proof of its capabilities, the company implemented its own high-performance strategies and technologies in the design and construction of its Brenzel Technology Center at the Building Efficiency headquarters. The award winning building is a showcase for the company's sustainability approach and energy efficient technologies. The facility also proved that it doesn't have to cost more to build a high-performance green building.

Johnson Controls was founded in 1885 as a building controls, manufacturing and service company. Today, as a Fortune 100 company, Johnson Controls is a recognized leader in energy efficiency and smart environments. When the company was designing its new Brenzel Technology Center, demonstrating this leadership role became an obligation to itself and its employees.

The center's design team was determined to demonstrate that it could achieve a high level of efficiency without adding to the budget. The 130,000-square-foot facility was built for a cost just under \$17 million, which puts it in line with the market average construction cost of \$125 per square foot. The new building was one of the first to be certified Silver under the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) program, and the first to be re-certified, Silver to Gold. The center showcases the most advanced technologies inside while the exterior mirrors the traditional 100-year-old headquarters next door. Technology doesn't stop



at the Bregel facility. The headquarters building is part of the LEED for Existing Building's (LEED-EB) Pilot Program launched by the U.S. Green Building Council. Together, the 460,000-square-foot headquarters complex provides comfort, safety, energy efficiency and productivity.

Return on investment

"We did not calculate return on investment merely on sustainable aspects," says Ward Komorowski, director of facilities and building operations for Johnson Controls. To achieve their goals, the design team came together early in the process to integrate the building systems which resulted in approximately \$225,000 of initial savings.

Certain systems were upgraded which might have added cost but that cost was immediately offset by downgrading or eliminating other systems. "Due to our whole building approach, almost everything had a degree of sustainability to it, which created savings in many ways, states Komorowski."

Emissions Reduction. Compared to 1999 preconstruction levels of energy consumption, the following emissions were prevented since additional fuel was not required; 2,201,200 pounds of carbon dioxide, 13,940 pounds of sulfur dioxide, 5,500 pounds of nitrogen dioxide and 180 pounds of carbon monoxide.

Lighting. The Bregel Center consumes just 0.86 watts of electricity per square foot due to a state-of-the-art lighting system and the effective use of daylighting. This is significantly less than the state energy code requirement of less than 1.2 watts per square foot. Daylight accounts for 10 percent of the building's potential energy use and allows perimeter light fixtures to be dimmed.

Maintenance. Although the Bregel Center added 130,000 square feet to the Johnson Controls headquarters complex, not a single maintenance person was added because of the innovative practices used.

Energy. Total square footage for the complex increased nearly 45 percent yet total energy costs increased just 17 percent in the first year. Overall energy consumption increased only 15 percent over the same period and actually decreased 20 percent when expressed as BTU per square foot.

Productivity. New space configurations encourage teaming environments and have lead to a more productive work force. Environmentally friendly products and excellent ventilation make for a happier, healthier work force.

A showcase of technology

Through the use of individual control systems, automation and information tracking, Johnson Controls achieves each of the

Johnson Controls achieved a high-performance green building within a conventional budget, resulting in no incremental investment.



Quality Building Environment's four goals - comfort, safety, energy efficiency and productivity.

Individual Control. Johnson Controls Personal Environments® environmentally responsive workstations (ERWs) provide employees greater comfort and control of their workspaces. Desktop control units allow employees to adjust temperature, lighting, air flow and acoustic characteristics as needed to maintain personal comfort.

Automation. Johnson Controls Metasys® building management system provides full integration, monitoring and control of heating, air conditioning, lighting, security and fire systems. Through available cost reports and trend analysis, operations personnel are able to increase overall efficiency of the facility.

Information Systems. The Bregel Technology Center demonstrates the latest in information-gathering tools including energy sub-metering, load profiling and cost-report generation. This information allows the building manager to negotiate with energy suppliers and easily identify opportunities to save energy. In addition, a roof-mounted weather station is used to provide building control applications, operator information and building occupant notification. "The weather station allows us to build a history of what we need to do to maximize our efficiency based on the weather situation," says Komorowski.

High performance strategies are golden

The Bregel Center's sustainable features extend beyond those supported by advanced technologies. High performance strategies were also incorporated into design and construction and are a part of the ongoing operation of the facility. The Bregel facility was built on an existing site to minimize its footprint and environmental impact and incorporates an open courtyard green area at its center. Open ceilings in the facility decreased materials used. An aggressive construction waste management plan was implemented along with the re-use of many existing materials.

Other strategies include a high shade efficient window system, rainwater recovery system in cooling towers, storage and collection of recyclables, water efficient fixtures that reduce use by 20 percent, accessibility to alternative transportation and bicycle racks for employees. Ongoing efforts include modified housekeeping specifications, improved exterior landscaping and snow removal procedures, additional lighting and plumbing fixture upgrades, upgraded copy machines for better indoor air quality and recycling and daylighting strategies. These efforts have resulted in the Bregel Center being the first re-certification of a LEED project from Silver to Gold under LEED for Existing Buildings.



Through LEED initiatives at the Bregel Technology Center and its entire headquarters complex, Johnson Controls will realize energy and operational savings of more than \$4.2 million over 10 years.



As the performance of the Brengel Technology Center continues to improve, so does the performance of the entire complex. The center has served as a benchmark for the remainder of the complex including the 100-year-old headquarters. These buildings have undergone similar upgrades as part of the LEED for Existing Buildings Pilot Program and the entire complex is going through the certification process for LEED's Gold level. Johnson Controls benchmarked the Brengel Center to the ENERGY STAR® point level of 50. The building is realizing more than \$76,000 in energy savings annually and a 35 percent reduction in operating costs. Energy and operational savings for the entire complex are more than \$333,000 annually, which will equate to more than \$4.2 million over 10 years.



Systems integrations at the Brengel Technology Center provided an initial savings of more than \$225,000.

