

CASE STUDY: ENERGY MANAGEMENT SYSTEMS
 COLORADO

1670 Broadway

Maximum Efficiency, Minimum Interruption

SMART NEW SYSTEM WORTH THE INVESTMENT ON WALL STREET OF THE ROCKIES

A collaborative approach

Efficiency was always a top priority at 1670 Broadway in Denver but the engineering team and property manager at Cushman & Wakefield of Colorado, Inc. knew more could be done. They had implemented various lighting, motors, cooling and compressed air projects to operate more efficiently, but determined it was time for a more comprehensive approach. To get started, they turned to several energy expert resources, including their utility, Xcel Energy, Denver’s Group 14 Engineering, and Klok Group Engineering.

Built for efficiency

1670 Broadway is a Class A Leadership in Energy and Environmental Design (LEED) gold certified high-rise office tower located in the central business district of downtown Denver, a financial hub also known as the Wall Street of the Rockies.

The tower is part of an investment portfolio advised by UBS Global Asset Management, which believes strongly in integrating sustainable initiatives whenever economically possible. It’s not just policy for this building, UBS has a Global Sustainability Workgroup to develop and implement sustainability and responsible practices across its real estate businesses throughout the world.

The office tower boasts nearly 700,000 rentable square feet and an adjoining parking facility. At the time of construction in 1978, it was the tallest building in downtown Denver. It was built with efficiency and conservation in mind, but has been continually enhanced to incorporate new innovations to address ever-changing tenant needs. The goal has always been twofold: keep tenants comfortable, while containing operating costs.

No strangers to rolling up their sleeves and making improvements, the team began with a detailed Recommissioning of all energy consuming systems in 2012. The study identified numerous low and no-cost measures in addition to capital improvements that would facilitate the owner’s goal of achieving enhanced efficiency.



PROJECT SNAPSHOT	
Project	Installed new EMS system to maximize efficiency throughout the building
Total project cost	\$591,593
Xcel Energy rebate for measures implemented	\$183,527
Estimated annual energy savings	\$128,810 and 2.6 million kWh
Payback term	2.7 years

Low-cost measures and tenant teamwork

“The whole building approach is such a smart way to go about improving efficiency because it achieves more global energy savings throughout the building,” says Sharon Panas, Xcel Energy account manager. Panas helped the building engineering team through the process. “I commend them for taking this approach, even though it takes longer and involves more challenges. Their energy savings wouldn’t be as great as they are had they done the work one project at a time.”

The work started with simple, no-cost and low-cost measures that required tenant cooperation. With tenant approval, the engineering team curtailed lighting and HVAC systems on the weekends; streamlined lighting zone controls; and limited elevator operation during off hours and weekends to two out of five operational cars. Those simple measures then lead to larger changes.

The Recommissioning study determined that a new energy management system would vastly improve the building's overall efficiency. "With full occupancy and various tenant needs that constantly change, we needed a system that allowed flexibility," says Mike Turzanski, Cushman & Wakefield director of engineering. "Many of our tenants work in the information technology space meaning a higher pull on energy load. They couldn't have any interruption to their services, so we had our work cut out for us."

New and improved EMS

The engineering team quickly determined which energy management system or EMS would work the best, based on the ability to meet the requirements for an expandable, open protocol system to continue to meet the changing needs of 1670 Broadway's tenants. The system platform had to accommodate real time Web-based building controls and allow intercommunication with lighting, security, fire alarm and smoke control systems. Incorporating new direct to digital controls or DDC, was a must.

New equipment included a main server, workstations with monitors, printer, communication backbone and related routers, hardware, software and licenses to control and communicate to the tower's HVAC system. The system also provides static pressure controls, auxiliary lighting, damper controls and floor temperature controls.

To sweeten the deal, Xcel Energy offered a rebate of \$183,527, offsetting the cost of the new equipment and helping justify future efficiency upgrades. The future energy savings will help them pay back the project in less than three years.

"The new system allows us to deliver 'smart' operations through enhanced controls and continuing system commissioning," says Turzanski. "We also acquired more efficient mechanical scheduling and staging as well as demand programming limits which allow us to minimize demand costs."

"The system is very user friendly but the building requirements are not," says Judy Purviance-Anderson, general manager of the property. "Now we can accommodate and adapt to complex programming to deliver services to the tower and its occupants."

Big savings

Six months following its completion in January, 2014 the property already realized the following savings:

- **20% reduction in overall electrical use** or 1,116,000 kWh saved
- **25% reduction in overall district steam energy use** or one dekatherm of energy saved

"Every month that we've had the system in place, our ENERGY STAR® score has increased, and we're still working to improve it further," says Turzanski. He adds that training his staff to properly use the system is paramount to future efficiency.

Smart technologies

While working to make all of the systems communicate, Turzanski and his team decided to incorporate an analytic software tool. The software is a "smart" device, enabling the collection and analysis of various system data in real time. It alerts engineering when an electronic or mechanical component is operating outside of its programmed parameters. The result is a proactive rather than reactive response to potential challenges. It will also be used to continually recommission the system's performance to easily identify inefficient equipment behavior.

"The system can handle complex programming and will continue to adapt along with our changing needs," says Purviance-Anderson. "It's a tremendous asset to us and will continue to help us keep our tenants comfortable."

Next steps

They're not done yet. Included in 1670 Broadway's capital plan is a new, expanded capacity integrated flat plate heat exchanger, as well as a two-phase DDC retrofit for base building air distribution boxes. In layman's terms, that means they'll save even more energy while lowering their bills.

Turzanski says he'll continue to look for ways to save with Panas' help both in finding and facilitating Xcel Energy rebates. "We all win in the end: tenants get improved environmental conditions and lower bills, and we continue to reap the savings for years to come."



For more about Xcel Energy's energy efficiency programs and rebate offerings, visit ResponsibleByNature.com/Business.