



High performance multi-tenant buildings

Constructing high performance multi-tenant commercial buildings is a challenge because of the complex relationship between the developer (and investors) and the prospective tenants. Both the developer and the tenants make decisions that will influence the energy performance of the building. The developer makes decisions affecting the building overall (shape, exterior walls, windows, some mechanical systems), while tenants make decisions affecting the build out of their space (interior wall placement, lighting systems).

Because of the cost pressures in the multi-tenant building market—building developers and owners need to keep rental rates reasonable in order to attract tenants—a building developer can't construct a high performance building simply by purchasing high performance technologies. This constraint is exacerbated by the fact that owners will not see the direct benefits (energy cost savings, productivity gains, improved occupant health, among others) of an increase in building performance. Those benefits will accrue to the building's tenants who pay the utility bills and whose employees work in the space. Tenants are mainly concerned with building out their space quickly and within a pre-determined budget so they can move in without losing too much productivity.

As a result of these constraints, the majority of high performance buildings today are either public or owner-occupied. But there are building developers willing to embrace and overcome these challenges and create sustainable multi-tenant buildings. Their tenants appreciate the higher quality and performance of the building components, the improved indoor environment, and a chance to commit to sustainability. As a result the buildings are not only good for tenants, but also for owners.

DEVELOPING A HIGH PERFORMANCE MULTI-TENANT BUILDING AT 749 UNIVERSITY ROW

The building at 749 University Row is a highly energy efficient, multi-tenant office building constructed in Madison, WI in 2013. The building's developers, University Crossing Investors and Krupp General Contractors, accepted the risk of developing a high performance sustainable building because it met both long term and short term objectives. For the long term, buildings with high performance, sustainable attributes provide attractive, financially competitive space for their full useful life while more traditional construction will become functionally obsolete as the industry adopts more rigorous performance standards. In the short term, high performance buildings make financial sense for two reasons: building operating expenses, in general, are lower in high performance buildings, providing savings for tenants; and more businesses are interested in leasing space that demonstrates sustainable practices to their clients. Because University Crossing Investors and Krupp General Contractors saw the business advantages of constructing a high performance building, they invested in creating a multi-tenant building that would meet the US



749 University Row. (Photo: Nels Akerlund Photography)

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Green Building Council’s highest performance criteria—LEED Platinum—and use less than 40 kBtu/ ft² per year. They pursued LEED for Core and Shell, a rating system tailored for multi-tenant development because it allows developers to address whole building performance while providing tenants flexibility in building out their individual space.

“Traditional buildings will be functionally obsolete and not able to compete [with high performance buildings] by the end of their useful lives.”
—Paul Lenhart, *president of Krupp General Contractors*

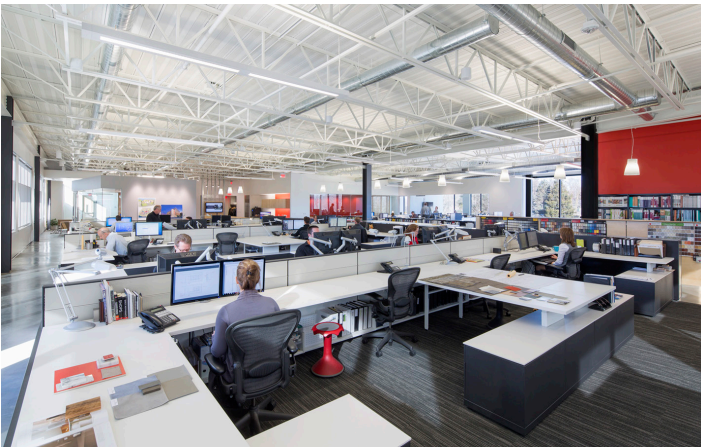
The building was constructed for an approximate cost of \$210/ft², including tenant build-out costs. This cost is comparable to similar Class A offices in the region, resulting in lease terms that are at market-rate, but for tenant and common spaces with an abundance of daylight, excellent indoor air quality and low energy costs. As a result, all the space in the building rented immediately in a market in which there was not tremendous demand compared with supply. Several of the tenants rented with long-lease terms of 10 years or more.

749 UNIVERSITY ROW OCCUPANCY				
		DATE OCCUPIED	FLOOR AREA (ft²)	SUSTAINABILITY
Tenants	Architect	Oct 2013	9,142	LEED Platinum interior
	Dental office	Sep 2013	12,000	
	Energy efficiency nonprofit	Nov 2013	9,996	LEED Platinum interior
	Financial services	May 2014	1,080	
	General contractor	May 2014	4,280	
	Healthcare nonprofit	Jun 2014	2,230	
	Medical office	May 2014	19,950	
Other space	Storage	Varies	1,742	
	Parking	Sep 2013	16,187	LEDs, energy recovery, controls
	Common space	Sep 2013	9,426	

The building at 749 University Row has seven tenants, two of whom chose to pursue LEED for Commercial Interiors for their interior build-out. The tenants range from a dental practice to an architectural firm; from a financial services company to administrative offices for health care clinics. All pay rents that are near market rate. The building spaces and tenants are summarized in the table above.

Overcoming challenges

Krupp General Contractors, the construction contractor for 749 University Row (and one of the building owners), specializes in sustainable construction for residential,



Tenant space for architecture firm Potter Lawson. (Photo: Nels Akerlund Photography)

office, and healthcare buildings. Their approach to delivering affordable high performance buildings begins with transparent communication about the goals and objectives with all project stakeholders, from contractors to prospective tenants. To keep costs in check they plan for building performance by creating specific project requirements that form the basis of the building design. To balance the costs with varying interests in sustainability across all their prospective tenants, Krupp establishes a base level of building performance while giving tenants flexibility to add sustainable elements to their spaces.

For example, Krupp established a base level of high performance for the HVAC system, indoor air quality and waste recycling. These standards were documented and communicated to prospective tenants up front because it was important for them to understand the impact of these decisions on both their rent and utility costs. Krupp chose a variable refrigerant flow HVAC system because of its energy efficiency and small footprint, significant advantages over more traditional VAV systems. This HVAC system also makes it possible to individually meter tenant space and have tenants pay for their actual energy use (giving them incentive to reduce their energy use).



A contractor’s office occupies a portion of the first floor. (Photo: Nels Akerlund Photography)

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A dental office on the first floor of 749 University Row. (Photo: Nels Akerlund Photography)

Opportunity for additional performance was provided to tenants via elements such as the energy-efficient shell (windows and walls), ample daylight, and variable ventilation capability (VFDs and dampers). Tenants had the flexibility to go beyond the base level of performance by leveraging those features to implement demand controlled ventilation, automatic daylighting controls, and building automation and monitoring in their individual spaces, to the degree that each of them desired.

Before the building at 749 University Row was completed, the developer had several tenants who were either committed or interested in leasing space, and was able to discuss these optional elements with them all early in the design process. They then knew what features were of interest to tenants, making various design decisions easier and more directly applicable to achieving LEED Platinum for Core and Shell. This feedback helped the project become a success.

Performance assurance with multiple tenants

Ensuring that a building meets its performance levels once it's constructed is a challenge. This is especially true with multiple tenants in a building. The developer of the building at 749 University Row addressed this challenge with several strategies.

INDIVIDUAL TENANT UTILITY METERING. The HVAC system at 749 University Row allows for individual metering of tenant space. Because of the individual metering, tenants signed net leases with terms requiring them to pay their individual utility costs. This arrangement allowed the building owner to save on administrative expenses associated with allocating and collecting utility costs. It also gave tenants motivation both to choose more efficient lighting and controls in their build-out and to operate their space efficiently – turning off lights, choosing appropriate temperature settings, etc. In attempting to achieve high

levels of actual performance (as opposed to theoretical, modeled performance), building operation can be as important as design or construction. With multiple tenants, individual metering is an important method to ensure efficient operation.

COMMISSIONING AND HVAC BALANCING. In a commercial building the lighting, HVAC, and plumbing systems need a significant amount of tuning and adjustment after they are initially put in place. This 'startup' phase ideally includes both balancing, in which the air and water flows are tuned to respond optimally to controls, and commissioning, in which the overall performance of each system is checked to ensure it performs to its design specifications. These processes were somewhat difficult to complete effectively in the building at 749 University Row because tenant move-in dates were staggered over a 9-month period. Each tenant had a slightly different approach to controlling their lighting and HVAC use, as well.

Reflecting on the process of constructing the high performance building at 749 University Row, Paul Lenhart, *president of Krupp General Contractors*, said **"I'm certain there are materials and strategies being used here that can be applied to other building projects, even the non LEED projects."**

Because of the staggered move-in dates, the outside air system initially was connected only to those spaces occupied by the first tenants to move in. There were leaks in the system where ductwork was not yet connected, making balancing the system and commissioning the controls virtually impossible. To mitigate this problem, contractors temporarily sealed the connections and balanced and commissioned the system as best they could. However



(Photo: Nels Akerlund Photography)

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the problem recurred whenever a new tenant moved in, requiring a readjustment of the demand controlled ventilation system. Understanding the impact of staggered tenant occupancy allowed the commissioning and balancing agents to plan and budget for several site visits to adjust the system, knowing that the final adjustments wouldn't occur until all the tenants had moved.

MEASUREMENT AND VERIFICATION. The staggered move-in dates also affected measurement and verification, the process by which the actual energy performance (based on utility bills and sensor measurements) is measured and compared with project goals. This process generally occurs over a 12-month performance period that serves as a benchmark for the building. The M&V

consultant waited until all tenants were in before beginning this period. It was also more difficult to get utility billing information because each tenant had to provide this data to the consultant. To help this process work more smoothly, the building owner informed each tenant what the consultant needed and why. The M&V process confirmed that the building is performing well.

The building at 749 University Row was awarded LEED Platinum for Core and Shell in September 2014. Two tenant spaces subsequently achieved LEED Platinum for Commercial Interiors. The building owner and developer is very satisfied with the project and expects that many of the strategies and lessons learned will be applied on other projects, even those that are not pursuing LEED certification.

OTHER RESOURCES

Green Lease Library, www.greenleaselibrary.com (a clearinghouse for publically available green lease resources)

Assessing the Value of Green Buildings, Institute for Green Buildings (Johnson Controls), www.institutebe.com, 2012

U.S. Department of Energy, Better Buildings Challenge, ""Green" Buildings Thriving in LA Real Estate Market, According to CoStar Report" Aug. 6, 2014. <http://la-bbc.com/news/green-buildings-thriving-in-la-real-estate-market-according-to-costar-report>

Barriers and Breakthroughs for Multi-tenant Developments, Rocky Mountain Institute. www.rmi.org/Knowledge-Center/Library/2008-12_BreakthroughsMultiTenantDevelopments