# Upper Iowa University Liberal Arts Building

## Innovative Hybrid HVAC System Achieves LEED Silver

Demonstrating leadership through forward thinking and sustainable building design was a key objective for the team collaborating on a new Liberal Arts Building for Upper Iowa University (UIU). In addition to a strong academic program, administrators for the 153-year-old post-secondary institution sought to differentiate the facility by providing a superior learning environment for students.

A USGBC LEED Silver designation for the building was targeted from the outset of the design process. In order to achieve this high standard, the design team challenged the status quo with a cutting-edge hybrid HVAC system that incorporates both underfloor air distribution and chilled sails.

The first of its kind in a U.S. college, this unique hybrid solution delivers significant savings in energy consumption, superior indoor air quality and a comfortable learning environment that will help students thrive.

Close collaboration between the design team, mechanical contractors and Price was key to the success of the installation and helped deliver a highly energy efficient solution.

## Project Summary

LEED Silver Certified

### PRICE PRODUCTS

Underfloor Air Distribution & Chilled Sails

### PROJECT HIGHLIGHTS

Location: Fayette, Iowa
Project Type: New University Construction
Project Cost: $8.6 Million
Year Completed: January 2010
Square Footage: 34,000 ft$^2$

### DESIGN TEAM

Architect: Meyer, Scherer & Rockcastle
Mechanical Engineer: Karges-Faulconbridge, Inc.
Price Representative: TMS Johnson Inc.

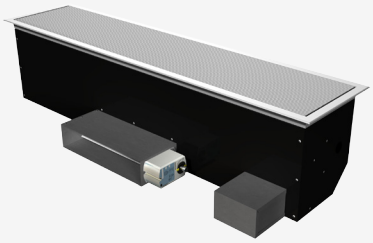
# The Challenge

## Challenging Design Convention

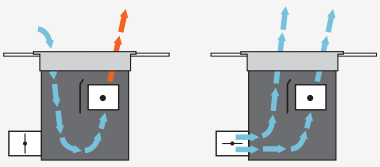
The core objectives for the Liberal Arts building's HVAC system were to deliver a solution that would reduce operating costs, provide maximum comfort for students and afford future flexibility as the utilization of the space evolved. The mechanical system would need to accommodate a high level design objective to ensure that the new building fit with the historic feel of the 153-year-old campus.

A number of traditional air distribution strategies would have made a significant impact on these performance criteria. The UIU design team, however, sought to challenge conventional performance expectations and demonstrate industry leadership by selecting a hybrid underfloor air distribution and chilled sail solution.

### Linear Floor Heaters



*Price Linear Floor Heaters provide ultimate flexibility in terms of style, performance and ease of installation. virtually eliminating the requirement for terminal units and ductwork.*



*The LFGH-RCV incorporates a heater for perimeter heating in a compact steel plenum to enclose all components. The LFGH-RCV can be ordered in multiple sections with a continuous grille to make installation easy while providing the architectural appeal of a continuous piece.*

Architectural firm Meyer, Scherer & Rockcastle, Ltd, (MS&R) and mechanical engineering firm Karges-Faulconbridge, Inc. (KFI) had successful experiences with underfloor air distribution systems in the past, but incorporating chilled sails in a hybrid solution would be one of the first design examples of its kind. Extremely close collaboration at all stages of design and construction would be essential.

# The Solution

## Hybrid System Helps Deliver Energy Savings

The Liberal Arts building achieved the targeted USGBC LEED Silver designation, and the high performance design achieved further recognition when Alliant Energy of Iowa offered the university a six figure rebate based on the energy efficiency of the facility. Using their own analysis, Alliant Energy found the UIU Liberal Arts building to be 67% more efficient than a conventionally designed "baseline" building. It is projected that the initial investment in energy saving systems will be recouped in approximately three and a half years through reduced operating expenses.

The underfloor component of the hybrid system ventilates the building with fresh air, while the chilled sail component delivers radiant heating and cooling to classrooms, offices and the auditorium. This elegant solution allowed the design team to achieve the core goals of flexibility and energy efficiency, while also benefiting from the pleasing architectural appearance and improved air quality of the hybrid system.

UIU was found to be 67% more energy efficient, with the initial investment being recouped in three and a half years.

Underfloor air distribution is renowned for the flexibility it brings to evolving spaces, as it uses an easily relocatable raised floor tile system and underfloor air plenum. The Price Underfloor Displacement Diffusers (UFDD) selected for the facility also provide superior indoor air quality – air in the space is thermally stratified and contaminants move up and out of the breathing zone, rather than being recirculated.

Chilled Sails use water to efficiently condition the space. Sails are a unique alternative to conventional radiant panels as they provide both a radiant and convective

*Linear floor heaters manage the skin loads along this corridor.*

component. Convection currents are created when warm air is cooled as it passes over the surface of the sail. This cooled air then naturally falls into the occupied zone, forcing warm air to rise.

Chilled Sails rely on the UFAD system to provide fresh air for ventilation, which greatly reduces the supply air volume requirement and makes the system extremely energy efficient. Due to their aesthetically pleasing appearance, chilled sails also fit extremely well into the architect's design vision for the building, making them both an architectural element and an HVAC system component.

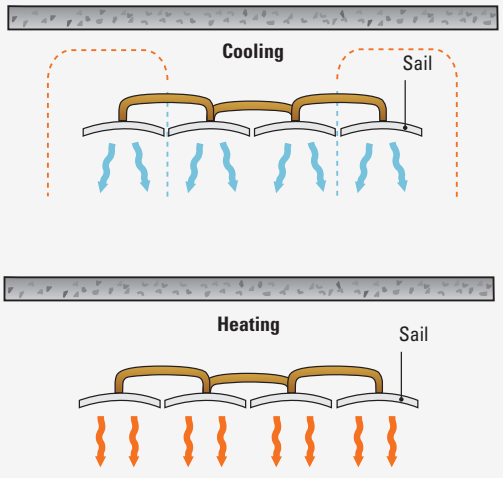
The raised-floor plenum used in UFAD is substantially smaller than the suspended ceiling necessary for an overhead system. This reduced construction costs and ensured a floor-to-floor height that was in line with other facilities on campus.

Price coordinated closely with the design team and the trades to make sure the installation was executed successfully. In addition to providing the design team with product selection, layout, and load calculation support, the Price team also travelled to Fayette during construction to provide support to the contractors during product installation. This on-site support helped the project flow smoothly, and was a welcome benefit for both the design and construction teams.

Executive Director of Facilities, Bryan Jolley, states that the building has already played an important role in illustrating design concepts and demonstrating to prospective students the ways in which sustainable design goals on the campus are being met.


*UFAD and Chilled Sails work together to provide a comfortable learning environment.*

## Chilled Sails




*The design of Chilled Sails promotes heat transfer via natural convection as well as radiation.*

# Design Team Profile

## KFI Engineers

Karges-Faulconbridge, Inc. (KFI) is a sought-after provider of systems and solutions for industries ranging from medicine to education and from manufacturing to refining.

Many of their relationships have started with clients presenting a problem that could not be solved by others. KFI prides itself on a structured, systematic approach to problem solving, reacting quickly and decisively on behalf of their clients.

## Meyer, Scherer & Rockcastle, Ltd

MS&R is an architectural firm with a focus on creating exceptional spaces that are inspiring, functional, and of the past while focused on the future. Their relationships with their customers are long standing ones and nearly 80% of their work comes through referrals. Identifying opportunities for sustainable design is a key factor in the way they approach new projects.

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