Looking Beyond Standard Solutions for Energy Issues

Einhorn Yaffee Prescott Architecture & Engineering P.C. — COLLEGE OF THE HOLY CROSS
Integrated Science Complex

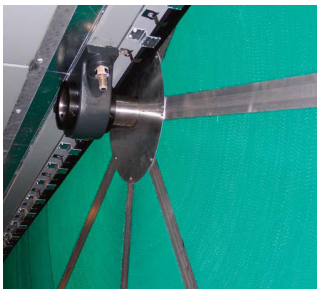
Open Science, Smart Energy

The College of the Holy Cross established several goals when planning to enlarge and renovate its science facilities. Through a highly inclusive participatory process, the College sought to: (1) design the spaces to say to all: "come inside, stay a while, see what is going on, and get turned on by science at Holy Cross;" (2) promote new teaching, curricular, and research connections among faculty from five originally disparate departments; (3) achieve the highest level of energy efficiency and cost-savings possible for a science facility in New England; and (4) have the facility itself speak about science, Holy Cross's science tradition, and energy utilization/savings.

It was clear from previous tours by perspective students (and their parents) that the science facilities were no longer a strong "sales" point for the College. The old building designs were not welcoming and did not draw people inside or encourage them to stay. Once inside the building, science was hidden from view. The great Holy Cross tradition of science education that has produced many of the nation's scientific leaders was threatened by the size and the quality of the aging spaces. Thus, to meet its goals and sustain its leadership position in undergraduate science education, a complete renovation of one building and construction of a new building were necessary.

"Come in and Stay a While"

Extensive use of interior and exterior glass makes science teaching and research activities evident to all and provides a bright unencumbered air to classrooms, laboratories and offices. Use of glass walls in laboratories enable good lines of sight and added to researchers' safety across adjacent spaces. To encourage diverse and active interactions of students and faculty, the design provides ample, carefully located areas of various sizes for individual study, group work, and social relating.



Strategic Interactions

Knowing that proximity can lead to new relationships among individuals, programs, and departments, a new building was strategically placed so that it physically connected the departments of biology, chemistry, mathematics/computer science, physics, and psychology. Within months of the new building's opening, new research and teaching collaborations had been established among students and faculty members of several of these departments. This connection also permitted new opportunities for sharing equipment, laboratories, and classrooms.

Energy Efficiency and Cost Savings

The planning team challenged the design team to use the absolute latest techniques to lower energy costs—while maintaining the highest level of both safety and environmental responsibility. Additionally, they insisted on ample flexibility in the design of the systems to accommodate yet unforeseen opportunities easily. With an extraordinary density of 46 fume hoods in 44,000 square feet of new construction and a goal of LEED Silver certification, the designers looked beyond standard solutions found in typical undergraduate science facilities. For the laboratory exhaust system, an "energy recovery wheel" was employed. This novel design has been up and operating successfully for over four years at several medical schools and pharmaceutical companies. The design for Holy Cross predicted annual 46% cooling capacity savings and 73% heating capacity savings. Incorporating the enthalpy wheel concept allowed the project to lower total energy consumption by over 35% from the "standard baseline"—earning the project eight LEED points and, more importantly, generating a payback calculated at 15 months. The College has determined that the payback has been fully achieved already in the twelve months the building has been occupied.

Incorporating an energy wheel concept had significant architectural implications. The size of the wheel and the configuration of the supply and return ductwork results in mechanical spaces that are effectively two stories tall. Additionally, great care must be used to work with only those manufacturers that can design the wheels to very precise tolerances, and thus produce the transfer media in consistent and exacting standards.

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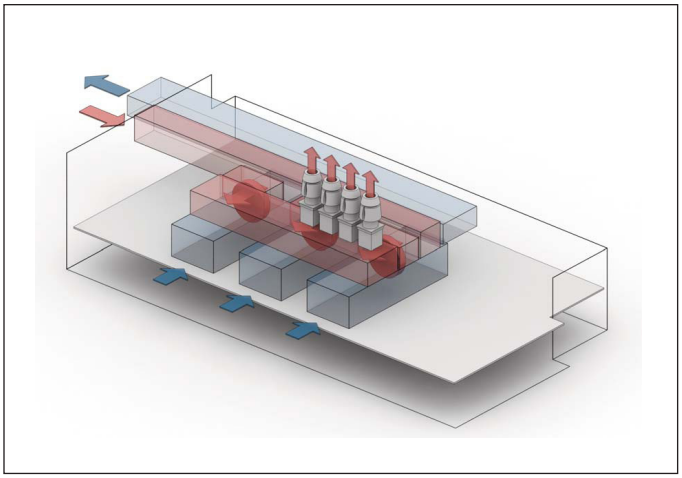


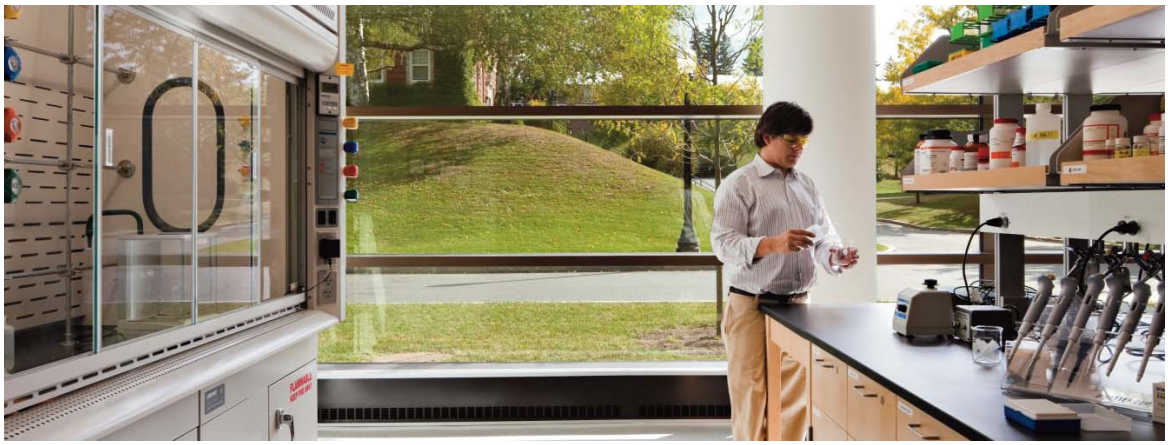
The Building Speaks about Science and Energy Savings

With a monitor in the lobby, students and visitors to the Integrated Science Complex can readily see the energy consumption of the buildings and assess the carbon foot print saved by the new technologies incorporated in the design. The monitor alternates these energy displays with photos and descriptions of the College's noted graduates, recent publications, student and faculty accomplishments, community science outreach programs, etc.— all while the excitement of science is evident in the surrounding spaces. Inviting areas to study individually and in groups, combined with an organic food café, complete the story that the sciences are important to the liberal arts and to Holy Cross and that all are invited to participate. ■

Another critical solution sought was to incorporate the newest generation in high performance fume hood design. The planning and design teams visited numerous

installations of the new "low flow hoods" that contain fumes in real world conditions at lower face velocities (70 fpm vs. 100 fpm) and are comparatively quiet. The

team selected hoods that passed the latest ASHRE design standards and contain the fewest moving parts internal to the fume hood itself— resisting designs that incorporate active motors adjusting baffles within the hood. This selection saved construction cost through smaller duct work, air handlers, fans, piping, and pumps— as well as operating costs every day by heating and cooling 35% less air.



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