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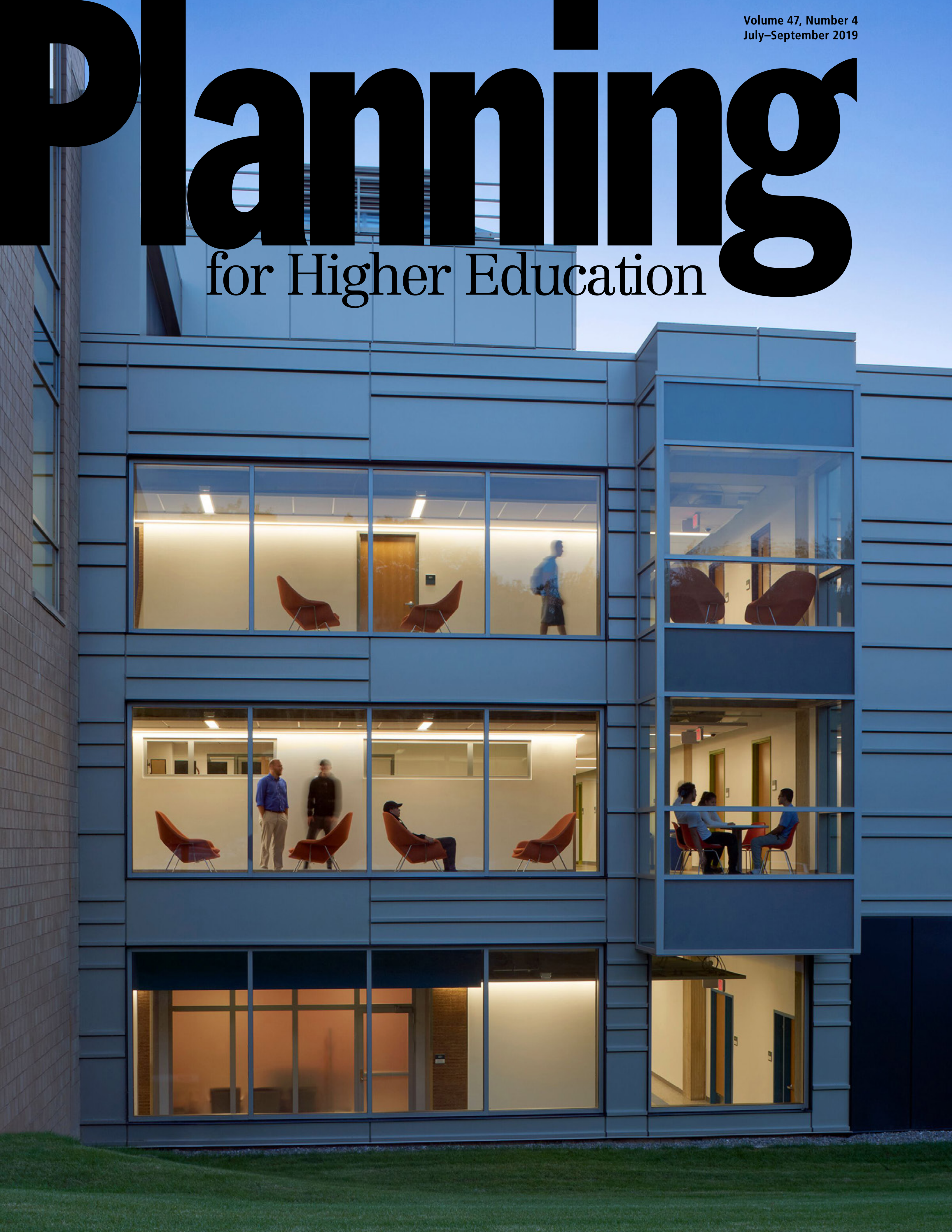

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At SCUP, we believe that by uniting higher education leaders, we can meet the rapid pace of change and competition, advancing each institution as it shapes and defines its future. Through connection, learning, and expanded conversation, we help create integrated planning solutions that will unleash the promise and potential of higher education.

Our community includes colleges and universities (two-year, four-year, liberal arts, doctoral-granting research institutions, public, private, for-profit, and private sector). Individuals we serve include planning leaders with institution-wide responsibilities, such as presidents, provosts, and other senior roles, to those who are in the trenches, such as chairs, directors, and managers.

WHAT IS INTEGRATED PLANNING?

Integrated planning is a sustainable approach to planning that builds relationships, aligns the organization, and emphasizes preparedness for change.

On the Cover

Binghamton University:
Science IV Building
Ashley McGraw Architects
Photo: David Lamb Photography

FEATURE ARTICLE

Another Day Older, Another Day Better

Institutions Are Infusing New Life Into Mid-Century Campus Buildings

by Matthew Broderick

While they might be historical gems, are mid-century campus buildings still structurally sound? Is their location and architecture meaningful to the institution? What about energy efficient and fiscally responsible? College and university leaders must make the call: to fix or not to fix.

Throughout the United States, university and college campuses have a disproportionately high percentage of older buildings; one estimate, based on data gathered by the facilities consultant Sightlines, cites almost 40 percent of university structures currently in use were constructed between 1960 and 1975. The State University of New York (SUNY) system alone is a powerful illustration of the perilous situation: Its 64 campuses are home to 1,181 buildings that have an average age of 47 years.

As those buildings and their mechanical systems rapidly reach obsolescence, university administrators and facility planners must make critical decisions about the fate of the structures and equipment. Should they be completely replaced, restored, or renovated? Answering that question involves a chain of interrelated assessments that address a range of issues—from a building's landmark status and construction scheduling to energy efficiency and funding options.

EVALUATING HISTORIC VALUE AND CAMPUS CONTEXT

One factor that should be considered early in the assessment process revolves around historic importance. Buildings that are outstanding examples of mid-century design are often worthy candidates for some level of restoration. However, most of the buildings from that era do not warrant meticulous preservation work. In those cases, facilities that were frequently composed of strong orthogonal forms and proportions present an accommodating blank canvas. What exists can form the basis of a new identity that supports the institution's image and better serves its students and faculty.

4 TAKEAWAYS

ASK WHETHER A RENOVATION IS RIGHT FOR YOUR CAMPUS BUILDING . . .

1. **Does your mid-century building fit into your overall campus plan?**
2. **Will your building's performance improve with an update?**
3. Numerous government agencies at the local, state, and federal levels offer **assistance for energy-efficient renovations**. Do you qualify?
4. Can you take your building offline during construction? If not, **prepare a logistics plan and schedule to minimize disruption**.

At Binghamton University (part of the SUNY system), the challenge was to transform Science IV—a visually mundane, energy-intensive, 77,000-square-foot 1973 classroom building—into an efficient, integrated, and welcoming element of the college campus. Jennifer Picciano, senior architect at Syracuse, New York-based Ashley McGraw (the firm overseeing the Science IV project) runs down a checklist of criteria to help ascertain a building's status.

Binghamton University, Science IV – A southwest view of the building before the renovation. *(Photo Credit: Ashley McGraw Architects)*

"To determine the significance of a particular building, we first must understand its history," she notes. "Was the building designed by a nationally or locally prominent architect or engineer? Does the design include the work of renowned artisans—such as stained glass or other artwork or ornament integral to the building fabric? Is the building an early example of or a notably well-executed example of a particular architectural style or typology? Is the building located at the site of an event that has meaning to the university or community? Does the building use materials or systems in a revolutionary way?"

How the mid-century building fits into the overall plan of the campus is another important point for evaluation. Does it engage in a "dialogue" with other buildings on a quad, act as a public gateway, or anchor an important vista? Or is the structure an outlier—in style or location—and could it be substantially redesigned without impacting the integrity of the campus context?

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In the case of what was dubbed the New New Quad at Butler College at Princeton University, a cluster of five 1964 dormitories designed by Hugh Stubbins was demolished after much study and debate. The buildings, described by the architect as "capturing the traditional scale of collegiate gothic architecture in a modern idiom," were replaced by a complex of student residences designed by Henry Cobb. "Ultimately, the Stubbins buildings couldn't be adapted to create the sense of community that we value," says Ronald McCoy, university architect at Princeton University. "Cobb's design restored many sightlines and pedestrian connections that were blocked by the structures by Stubbins."

UPDATING THE FLOOR PLAN

A hallmark of mid-century buildings is their simple, orderly floor plans that, with the application of creative vision and pragmatic programming, can be modified to support the evolving pedagogy of today.

At Rochester Institute of Technology, director of planning and design and university architect James Yarrington describes how KMW Architecture of Boston gave the former Max Lowenthal Hall, a 1970s building designed in the bold, sculptural style of Louis Kahn, a new sense of place. "The reworked floor plan flips the circulation to the outside walls and moves the teaching spaces to the interior. Several individual classrooms were combined to create a lecture hall," he says. To warm up the cast-in-place concrete structure without obliterating it, oak panels cap the half-walls in the atrium; oak rails with stainless steel stand-offs also add some welcome tactility to the space.

Composed of a fiefdom of private spaces—meeting rooms, offices, utility rooms—Science IV presented what architect Jason Evans, an associate principal at Ashley McGraw, describes as "a place nobody wanted to be. There were a million closed doors and very little space for anything to happen."

As learning beyond the classroom has become an accepted practice, the solution was straightforward. "We added more collaboration space, nooks and crannies where people can linger and meet," says Evans. "Now there are more places for social interaction."

ACHIEVING ENERGY EFFICIENCY

While the appearance and floor plans of those buildings are adaptable, bringing them into the 21st century as far as sustainability is concerned was quite another matter. Because many of those buildings relied on materials and technologies that were novel at the time of construction, they have not aged well over the years. That can compromise not only a building's structural integrity, but also its environmental and performance profiles. Some common problems include failing fenestration systems, deteriorating masonry, hazardous substances (including asbestos), and inadequate insulation.

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Updating the energy profile of mid-century buildings offers the most far-reaching potential for return on investment for institutions that are renovating their facilities. From community colleges to the Ivy Leagues, sustainability increasingly ties into a school's mission. One innovative approach that is flexible and affordable is the deep energy retrofit (DER).

A leading sustainability-research organization, The Rocky Mountain Institute, defines a deep energy retrofit as a whole-building analysis and construction/renovation process that achieves much larger energy and energy cost savings—sometimes more than a 50 percent reduction—than those of conventional energy retrofits. DERs also address improvements in the health and satisfaction of building occupants.

The Science IV building had a dismal energy record, particularly in efficiency and thermal comfort. To remedy that, a deep energy retrofit was employed: original windows were replaced with dual-pane, thermally-broken units, a blanket of insulation wrapping the exterior proved the optimal solution for improving the thermal performance and air-tightness of the chronically-leaky exposed concrete facade, and a metal rainscreen system both protects and refreshes the exterior. While data are still being compiled on the performance improvement brought about by that work, energy modeling forecasts a 64 percent reduction in Science IV's site energy use per square foot (also known as "energy use intensity," or EUI) and a 55 percent reduction in carbon emissions. That is on track to exceed New York's new state-wide standard that was issued in July 2018. The standard requires that complete-building renovations achieve a 50 percent reduction of the building's current annual EUI and a 25 percent reduction of its current annual site carbon consumption. As a comparison, the national average for site EUI of college buildings is 120.

Binghamton University, Science IV – A westside view of the building shows a portion of the new metal cladding (added to the exterior), new windows, and a glimpse of new interior collaboration spaces. (*Photo Credit: David Lamb Photography)*

Binghamton University, Science IV – A southside view of the building shows the new main entrance, new metal cladding, third-floor infill, and the existing tall masonry stairwell. (*Photo Credit: David Lamb Photography)*

Conventional retrofits most often focus on individual energy-conservation measures. DERs are achieved through an integrated approach that considers the building, its occupants, and the energy-consuming equipment as a symbiotic system. Greater savings can be achieved by focusing first on minimizing space-conditioning loads through the reduction of outdoor air infiltration and the reduction of heat transfer through the building envelope. Reducing space-conditioning loads reduces the required size of the HVAC equipment, driving down costs and further improving project economics. With energy use at a minimum, renewable energy sources also become more affordable, making the building a candidate for net-zero-energy use. Internal gains are reduced through the use of LED lighting, occupancy sensors, and efficient equipment.

At the core of a sustainable building program is identifying and balancing all of those variables. Energy modeling is a design tool that can be used to prioritize different energy opportunities based on owner requirements, existing conditions, and potential energy savings and carbon emission reductions. Every DER will have unique characteristics and goals.

A senior energy engineer at Rochester, New York-based Pathfinder Engineers & Architects, Jaimee Wilson says, “Based on our experience, we recommend working with an energy modeler and cost estimator early in the design process. The most effective use of energy modeling is in the initial stages of design, before the architectural and mechanical systems have been finalized. That allows the energy model to inform the building’s design based on specific, targeted performance goals.”

Binghamton University, Science IV – The opening spaces of the northside of the building will be infilled as part of phase 2 of the project. (*Photo Credit: David Lamb Photography)*

The services of a cost estimator can be invaluable when combined with the energy model results. Merging their expertise with the findings of the energy model can help keep the performance goals of a project in line with its budget limitations, avoiding the expensive and time-consuming process of going back to the drawing board to refine the design.

A SCHEDULING SOLUTION

Traditionally, campus building renovation projects involve taking a facility offline for the duration of construction. That's not a huge problem for small jobs that can be completed over the course of a summer, when the impact on students and faculty is minimal. But for more extensive projects, a coordinated logistics plan and schedule must be developed. If sufficient surge space is not available, working on occupied buildings—an extremely disruptive process even when it's carefully phased—may have to be considered.

A potentially groundbreaking approach to renovating the physical building and retrofitting its energy systems is being explored under the leadership of New York State Energy Research & Development Authority (NYSERDA). As part of the RetrofitNY program, they are trying to bring an approach similar to Energiesprong, an innovative, Dutch-developed construction method, to New York State.

Binghamton University, Science IV – An interior view shows one of the many new collaborative spaces that were added to the structure's corridors. (*Photo Credit: David Lamb Photography)*

In its European applications, it's essentially a high-tech plug-and-play process. Once the existing building has been laser-scanned for dimensions, and calculations for optimal energy performance are made, the construction components are manufactured. By using prefabricated, insulated facades and rooftops that are factory-fitted with solar panels and preassembled HVAC systems, Energiesprong enables performance to be driven up while costs and schedules are driven down. By dramatically shortening build time and reducing the need for skilled labor, the system presents an efficient alternative to standard construction.

That approach could have applicability on many college campuses, especially on simple structures like dormitories. The key will be building up the manufacturing infrastructure to produce the prefabricated components.

FUNDING OPTIONS

While one might think that the costs of a DER program would be prohibitive, that's not necessarily the case. Working with off-the-shelf components and technologies such as high-efficiency HVAC and heat recovery equipment, LED lighting, occupancy sensors, and other building controls as well as cool- and highly-insulated roofs, is a viable alternative to advanced building sciences and products. That said, DER, because it is a holistic design strategy, is not well suited to value engineering.

Binghamton University, Science IV – An interior view looks out over the new main entrance and vestibule on the southside of the building. (*Photo Credit: David Lamb Photography)*

There are numerous agencies at the local, state, and federal levels of government that offer assistance in realizing energy-efficient renovations of campus buildings and residence halls. In New York, NYSERDA has provided information and incentives for those projects since it was established in 1975.

A Green Revolving Fund (GRF) is an internal fund that provides financing to parties within an organization to implement energy efficiency, renewable energy, and other sustainability projects that generate cost savings. Those savings are tracked and used to replenish the fund for the next round of green investments, establishing a sustainable funding cycle while cutting operating costs and reducing environmental impact. GRFs provide benefits to colleges and universities beyond one-time investments, including promoting hands-on learning, enhancing institutional reputation, and building the business case for sustainability.

"A GRF provides constant focus on the idea that you want continuous improvement until you get to a carbon footprint of zero," says Anthony Cortese, founder of Second Nature and co-founder of the Intentional Endowments Network. "That doesn't happen if you use debt financing or some other kind of capital financing."

Conferring with colleges and universities that have experience with GRFs can help flatten the learning curve about structuring and implementing the program. Western Michigan University started the nation's first Green Revolving Fund in higher education in 1980. Since then, schools large and small have instituted GRFs, including Agnes Scott College, Arizona State University, California Institute of Technology, The College of William & Mary, Dartmouth College, Harvard University, Iowa State University, and the University of Vermont.

When designed with an eye to the future, revitalized mid-century buildings can enjoy a new life, playing a positive role not only on campus, but in the community beyond. By adopting an inclusive, informed strategy, university and college leaders can set a standard for environmentally and fiscally responsible design that will endure for decades to come.

AUTHOR BIOGRAPHY

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