

Capital improvement plan about more than bricks and mortar

UNIVERSITY PARK, Pa. -- Over the past decade or so, Penn State administrators have worked hard to provide a state-of-the-art learning environment for students at all campuses. At University Park and Altoona, business students have the benefit of a Wall Street trading simulator for use in their classes. Nursing and medical students at several campuses learn in simulation labs featuring advanced mobile human patient simulators that move, breathe, live and die realistically, to give students as close to a human experience as they can get during their training.

Communications students create their news stories in studios that rival those of commercial radio and TV stations. An upgrade to Borland Laboratory in 2004 led not only to a new and improved Creamery, but also to the installation of intermediate-scale processing and manufacturing equipment, plus a state-of-the-art teaching laboratory and a classroom, enabling students to learn on the same equipment they would see in the workplace. Students in the College of Information Sciences and Technology work in a Red Cell Analytics Lab to develop solutions to a wide range of security and risk problems with the aid of cutting-edge technology.

It is facilities such as these that enable Penn State to offer the high-quality educational experience that has it ranked No. 8 among all public national universities in the [U.S. News & World Report "2014 Best Colleges Rankings,"](#) No. 50 in the world according to [The Center for World University Rankings](#) and No. 48 on the [Kiplinger's list of Best Values in Public Colleges](#), based on combining outstanding education with economic value.

State-of-the-art facilities not only provide a venue appropriate for teaching in today's world; they also are a factor in drawing top faculty and students to Penn State. "Having a newly renovated space is one of the things that attracted me to come teach at Penn State. Not only is the lab space equipped with materials and instruments that allow the students to learn and practice techniques that are currently used in research labs across the country, but the bright and open environment is inviting and appealing to students as well," said Meredith Defelice, senior lecturer in biochemistry and molecular biology.

Still, there are many older buildings on all of Penn State's campuses that are in need of renovations and upgrades that will bring them on par with the newer facilities.

"We have about 13 million square feet of educational and general building space and about 9 million of it is more than 35 years old. Thirty-five years is an industry standard for reaching a stage of necessary renewal or replacement," said Ford Stryker, associate vice president for Physical Plant. That figure does not address space at Hershey Medical Center, in residence halls or other self-supporting units. Across Penn State's nine residential campuses, more than half of the residence halls are at least 43 years old. At University Park, the average living space is 52 years old. Renovations also are needed to meet mandatory Americans with Disabilities Act modifications.

In recent years, efforts to control costs and keep tuition increases as low as possible caused the University to cut back on the amount of money budgeted for deferred maintenance and some construction projects. For the second consecutive year, last year's budget included no

increase in funding for deferred maintenance.

“We have more than \$1 billion in deferred maintenance at Penn State, which eventually must be addressed because it can quickly translate into more costly repairs if left to linger too long. This plan for the long-term protection of our physical assets is an investment in our future,” said Stryker. “These improved facilities will better serve the teaching and research missions of the University and strengthen Penn State for years to come.”

The University's operating budget contributes only modestly to capital construction. Only \$2.60 of every \$100 of tuition and appropriation goes toward debt service. Construction dollars come principally from capital plan reserves, self-supporting enterprises, hospital revenues for clinical care, student facilities fees, philanthropy, and special releases of capital construction funds from the state.

In the near future, more than \$96 million in upgrades and replacements will be needed at University Park alone. This includes upgrades to health and safety systems, mechanical systems and fire/life safety systems, in addition to roofing and piping replacements. Also in the near future, almost \$45 million in either upgrades or replacements are needed at other Penn State campuses, including upgrades to security/access controls, heating ventilation and air conditioning systems, interior upgrades and wireless infrastructure, along with roof replacements.

“There is an acute need to upgrade the instructional laboratories for our undergraduate science classes,” said Daniel J. Larson, Verne M. Willaman Dean of the Penn State Eberly College of Science. “We are seeing the wonderful results from the renovation project completed three years

ago in North Frear Laboratory -- the first in a series of these much-needed upgrades. The renovations scheduled to take place in South Frear, Whitmore and Mueller laboratories will greatly enhance Penn State's teaching and learning environment for science classes that are taken every year by thousands of students from across University Park. The renovations will enable state-of-the-art scientific laboratory experiences in biochemistry and molecular biology, biology and chemistry. These upgrades will greatly enhance the learning experience.”

Despite Penn State's reputation as an academic powerhouse in energy science and engineering, the University ranks among the lowest in overall space per full-time-equivalent student of any public university in the Big Ten.

“The maintenance of that reputation will require the replenishment of retiring faculty with the best young professors who are entering the academic workforce. Successful recruitment and retention of those new faculty members will require having the same state-of-the-science laboratories and teaching facilities as our competitors,” said William Easterling, dean of the College of Earth and Mineral Sciences. “Moreover, enrollments in the Department of Energy and Mineral Engineering, which occupies the majority of Hosler Building, have tripled over the past five years. Students in the department demand the latest active learning laboratories. We owe it to those students to provide them with those learning technologies. State-of-the-science learning and research facilities can no longer be retro-fitted. Such makes no sense from an economic or functionality standpoint. We literally must start over and redesign the building for the 21st century. The rewards we will reap will pay for the Hosler renovation many times over.”

Among the renovations planned are major upgrades to Steidle Building, home to the Department of Materials Science and Engineering. “Materials Science and Engineering (MatSE) is one of the preeminent internationally acclaimed programs at Penn State that consistently ranks in the top 10 of materials programs. Plans to substantially renovate Steidle Building will ensure that the College of Earth and Mineral Sciences and Penn State will continue to have one of the premier departments in materials. The newly renovated building will further strengthen MatSE and thus be a destination for top faculty and student talent,” said Gary Messing, head of the department. “The new teaching spaces for 3-D printing, computation and materials processing and testing will enable state of the art education for materials undergraduates.”

The new shared research space model in Steidle also aligns the department with the Materials Research Institute cross-disciplinary research model and allows research thrusts in the processing and mechanical behavior of structural materials used in the automotive and energy fields, electrochemical studies that are key to corrosion and energy storage, nanomedicine research, polymer chemistry and physics and finally a new thrust in computational materials, according to Messing.

Whitmore Lab also is on the list of planned facilities upgrades. “If the preliminary plans are approved, general chemistry will be expanding (in Whitmore Lab) from eight labs that can accommodate 216 students, to 10 labs that will provide instruction for 240 students at one time. In addition, an 11th multi-purpose room could be added to provide space for instrumentation, special types of instruction and student projects,” said Joseph Keiser, senior lecturer in chemistry

and a faculty representative on the planning committee for renovations in Whitmore Lab. As envisioned, the multipurpose room would have space for 24 students, and capacity for live broadcasts regarding lab instruction to any of the 10 general chemistry lab rooms, or to anywhere in the world. “These renovations will enable us to provide high quality lab instruction for the next generation of scientists,” he said.

Renovation designs also are in progress for Burrowes Building on Penn State's University Park campus. The original 50,000-square-foot structure was built in 1940 and was expanded with north and south additions in the 1960s. A major part of this renovation project will be a reconfiguration of the architecture, particularly in the 1960s additions, to improve accessibility. The upgrades also will increase the number of offices and replace its utility infrastructure. “We also intend to attain LEED certification (Leadership in Energy and Environmental Design) on this project,” said Stryker. LEED certification is an industry benchmark for energy efficiency and high performance green design.

“Renovations and upgrades such as these carry large price tags, but they are absolutely necessary to keep Penn State at the forefront of education. We're talking about more than bricks and mortar here. By addressing these facilities needs, what we are doing is investing in the future of our students,” said Nick Jones, executive vice president and provost.

“This is an investment that will make the best and brightest students continue to want to come here, and one that will continue to produce graduates that employers want to hire,” said Jones. “It's an investment we cannot afford to put off any longer.”