REFERENCES

Halls of Ivy—And Crumbling Plaster

Amid a building boom, colleges scramble for funds to keep up aging facilities

By Jane Porter
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College students and their parents have come to expect flashy campus amenities: towering research labs, sprawling B-school trading floors, and recreation centers with 50-foot rock-climbing walls. And the nation's universities have in recent years launched a multibillion-dollar construction frenzy akin to an arms race.

What you may not realize is that many existing buildings on the nation's campuses are falling apart. Blame old age and less-than-diligent maintenance. "When dollars are flowing into new facilities," says Terry W. Ruprecht, director of energy conservation at the University of Illinois at Urbana-Champaign, "they aren't flowing into old facilities. It's taking an existing problem and making it worse."

The issue is how schools will pay for this. According to conservative estimates, the nationwide repair bill could reach $40 billion. Asking well-heeled contributors to open their wallets isn't an answer since most philanthropists want to see their names on a fancy new building, not a fixer-upper. "Maintenance doesn't have that allure to a private donor," says James E. Alty, director of facilities services at the University of North Carolina at Chapel Hill. As a result, students and their parents are more and more expected to foot the bill, especially at state schools where funding is tight.

More than half the buildings on U.S. campuses were slapped up in the 1960s and '70s, a period when enrollment nearly doubled. Today those buildings are pushing 40. It's not a pretty picture. At Kansas State University, limestone exteriors are crumbling, the electrical system shoots sparks on humid days (workers call the control room the Frankenstein room), and the wind whistles through the eight-foot, single-pane windows at Waters Hall, whose deteriorating frames date back to 1923. The University of Illinois, meanwhile, has just completed a new $80 million institute for genomic research but has a backlog of repairs that will consume as much as $600 million. Chapel Hill's outstanding maintenance bill: $400 million, on top of 25 new building projects. And so it goes, from coast to coast.

To deal with the problem, schools are hiring consultants to conduct on-site assessments and prioritize maintenance projects. Others are seeking additional state funding, borrowing cash, or diverting existing budgetary funds to the most pressing projects. Several universities are adding a surcharge to tuition fees to help cover the outlay. At the Illinois campus of 41,000, students were hit with a $500 annual maintenance fee last fall--raised to $520 this year--to bring in more than $20 million a year for the campus' $573 million worth of high-priority repairs and replacements.

Sometimes the buildings are so outmoded that fixing them is just not worth it. The University of Texas at Houston is simply demolishing five buildings in need of updates and building anew. But even that is not a solution. Tearing down the 17-floor, limestone-and-steel Houston Main

building next year will cost $6 million, not to mention the $250 million to build a new medical research and treatment facility in its place.

Having learned their lesson from the ‘60s building boom, universities these days are planning new projects with long-term costs in mind and investing in energy-efficient, low-maintenance designs. But there’s only so much they can do. The shorter lifespan of the electronic gizmos found on the modern campus--interactive whiteboards, motorized window shades, and remotely operated lighting--means frequent upgrades. And with enrollments rising, the cost of accommodating additional students will rise, too. William A. Daigneau, head of facilities at the University of Texas M.D. Anderson Cancer Center, says considerations such as these must be top of mind. “Once you’ve got that brand-new asset,” he says, “you’ve got a liability.”

Society for College and University Planning Southern Regional May 2007 report
(http://www.scup.org/pubs/SEN/2007/May/scupso_20070504.html)

KENTUCKY

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Kentucky Receives Final Higher Education Facility Audit Report

The Kentucky Council on Post Secondary Education on April 4, 2007, received the final report on the statewide Higher Education Facility Condition Assessment and Space Study Project. The consultant study reviewed: 1) the condition of existing facilities within the state system 2) the adequacy of the facilities in being able to meet their intended purpose and 3) the need for additional facility space capacity to meet current and future needs.

The study documented that most Kentucky institutional facilities are in excess of 30 years old and building systems have gone well beyond useful expected life cycles. In addition, the study reported that according to accepted industry standards that a significant amount of statewide facilities are in poor condition. The study found that billions in state investment may be required over the coming years to address the issues of university facility needs. The study results included a 15-year funding plan documenting needs of $5.3 billion for system renewal; $860 million for adequacy or fit for use improvements and an additional $6.4 billion in new building needs.

A similar study several years ago in North Carolina estimated a need in that state for about $7 billion. North Carolina responded with passage of a $3 billion dollar bond issue.

Building Florida's Future: Quality and Access or Business as Usual?

November 15, 2006

Mark B. Rosenberg
Chancellor
Board of Governors
State University System of Florida

Building Florida's Future: Quality and Access or Business as Usual?

Executive Summary **3**
Introduction **6**
Size and Types of Space *8*
Facilities Growth since 1985-86 ..... *8*
Florida and the Nation *9*
Recommendations **11**
I. Improve Efficiency: Best Practices in Utilization, Maintenance, Construction and Design *11*
A. Use Space More Efficiently 11
1. Conduct a thorough utilization review 11
2. Establish high standards 11
3. Give universities policy flexibility, including differential tuition authority 12
B. Streamline Planning, Design and Construction Processes 12
1. Revise the educational plant survey process 12
2. Streamline the capital improvement plan budget request 13
3. Accelerate fixed capital outlay funding releases 13
4. Increase the funding limit for minor projects 13
5. Streamline sales tax exemption process for building materials 13
C. Revise Plant Operations and Maintenance (PO&M) Processes 13
1. Request operation and maintenance funding for leased space 13
2. Allow corrections to previous funding requests 14
3. Allow changes in intensity of use due to renovations 14
4. Request funds for space converted to education and general (E&G) use 14
5. Adjust operating costs for existing buildings for inflation 14
6. Change indexes used for increasing base cost factors 14
II. Invest in the Next Generation: $3.4 Billion in Capital Funding for Quality and Access *15*
A. Conduct a Needs Assessment 15
B. Implement New Funding Mechanisms for Critical Space Needs 16
C. Update the Funding Source for Student Auxiliary Facilities 17
III. Preserve Florida's Investment: Maintaining and Improving Current Facilities *18*
A. Amend the 2007-2008 Budget Request 20
B. Allocate a Portion of Documentary Stamp Taxes to Capital Renewal 20
IV. Lead the Nation in Sustainability: Cutting-Edge Research, Engineering, Architecture and Planning *21*
A. Adopt Policies that Promote Sustainability 21
B. Recognize Institutional Achievements 21
C. Continue the Concurrency Trust Fund 21
Conclusion: Moving Forward **24**
Appendix 1: Calculation of 2012-13 Projected Need **25**
Appendix 2: Facilities Task Force Participants **26**
Notes **28**

Executive Summary

How many of Florida's four million children should expect to attend the State University System someday? And what should they find when they arrive? The bare minimum? Or world-class universities with facilities on a par with the best the nation has to offer?

A "business as usual" approach has corroded the link between the state's strategic priorities and its higher education facilities. It is time for a change of course.

A quarter of the system's current classroom, lab, office and study space was built in a single decade, from 1967 to 1976, as the state invested heavily in the educational infrastructure needed to serve its growing population. Since then, however, construction and renovation have fallen behind the pace of growth, even as the state made commitments, through the Prepaid Tuition Plan, Bright Futures scholarships, and other access initiatives to encourage students to attend college. Florida now has far less space per student in its university system than other states, and the squeeze is only going to get worse.

Florida must set the bar for quality high. Students and parents deserve the best, and the state cannot afford less if it is to achieve the goal of becoming a leader in the new global economy of ideas.

What does world-class competition look like? The University of Cambridge—a public institution which has produced more Nobel prizewinners than any other university—is not resting on its laurels, but is developing $900 million in new facilities.[i] Closer to home, institutions and systems around the country are making big new strategic investments. The University of Michigan, for example, recently completed a 472,000 square foot, $187 million facility to house its biomedical research programs.[ii]

While the state's needs and ambitions have grown, the structures in place to plan and fund higher education facilities have not kept up. The system has operated reactively—constructing buildings as funding becomes available—rather than planning strategically for its long-term future and proactively investing to ensure competitiveness.

Recognizing the urgency of the need for a change in course, a state university system task force convened in spring 2006 to recommend changes that would make it possible to move forward with major new statewide facilities initiatives. The task force included representatives from all eleven institutions, including provosts, vice presidents for finance, and senior administrators responsible for planning, budgeting, and facilities management. The task force focused on construction, maintenance and deferred maintenance, and made recommendations to Chancellor Rosenberg related to increasing efficiency, identifying and expanding revenue streams for investment, and

improving processes in each category. The work of the task force is the foundation for the four key recommendations in this report:

University of Michigan's New Biomedical Research Building[iii]

I. Improve Efficiency: Best Practices in Utilization, Maintenance, Construction and Design

Key Recommendation: The Board of Governors should raise standards for classroom and instructional laboratory use to be among the highest of any public system in the nation. Funds for new classroom facilities should be directed first to institutions already making maximum *year-round* use of existing space.

With 30% fewer square feet per student than other public institutions in the United States[iv], Florida needs to make the most of its existing facilities. If the projected need for additional classroom and teaching laboratory space could be reduced by 10% to accommodate the same level of enrollment, nearly $50 million could be saved in new construction costs. A 25% reduction would save $120 million.

In addition to raising the utilization standard, the system should also adopt a series of other measures, outlined in this report, to improve efficiency in all phases of the building cycle from planning to construction to operations and maintenance.

II. Invest in the Next Generation: $3.4 Billion in Capital Funding for Quality and Access

Key Recommendation: Consistent with the long-term priorities of the system and the state, the Board of Governors should work with other public and private-sector leaders to develop an aggressive, strategic construction plan for the State University System.

While it is essential for the health of the system that the projects currently anticipating funding move forward as planned, these represent only a fraction of the investment that will be needed to keep up with growing student enrollments and the

expansion of research as our institutions mature. Further they may not adequately address the need for expansion through branches or joint use facilities, nor the possibility of new institutions in communities clamoring for a public university presence.

"Business as usual" would mean virtually no state funds for new university construction in the next several years, even as the system expects an additional 50,000 students by 2012-13 and aspires to make major advances in globally-competitive research. With nearly 350,000 students by 2012-13, the state will need another 14 million gross square feet of facilities, at an estimated cost of $3.4 billion. (See Appendix 1 for a more detailed calculation.)

III. Preserve Florida's Investment: Maintenance and Improvement of Current Facilities

Key Recommendation: The state should dedicate one or more funding sources specifically to maintenance and renovation of existing facilities.

The system has six million square feet of classroom, lab, office and study space, with an approximate replacement value of $2 billion, in facilities that have not been remodeled in over 25 years. If the usable life of the space could be extended for an average of 50% of that cost, the state would save a billion dollars compared to new construction. Accelerating the deferred maintenance agenda would be one of the fastest and least expensive ways to improve the quality and efficiency of existing buildings and to reduce needs for new construction.

IV. Lead the Nation in Sustainability: Cutting-Edge Research, Engineering, Architecture and Planning

Key Recommendation: The system should ensure that construction and renovation projects employ the most cost-effective, cutting-edge technologies to save energy and mitigate environmental impacts.

Universities spent $172 million in 2004-05 on utilities[v]. Small investments early in the planning and design phases of projects can pay off quickly in reduced operating and maintenance costs. With its fragile environment, Florida especially needs public institutions that model high standards of environmental and ecological responsibility for the future architects, planners, engineers, and construction managers they educate.

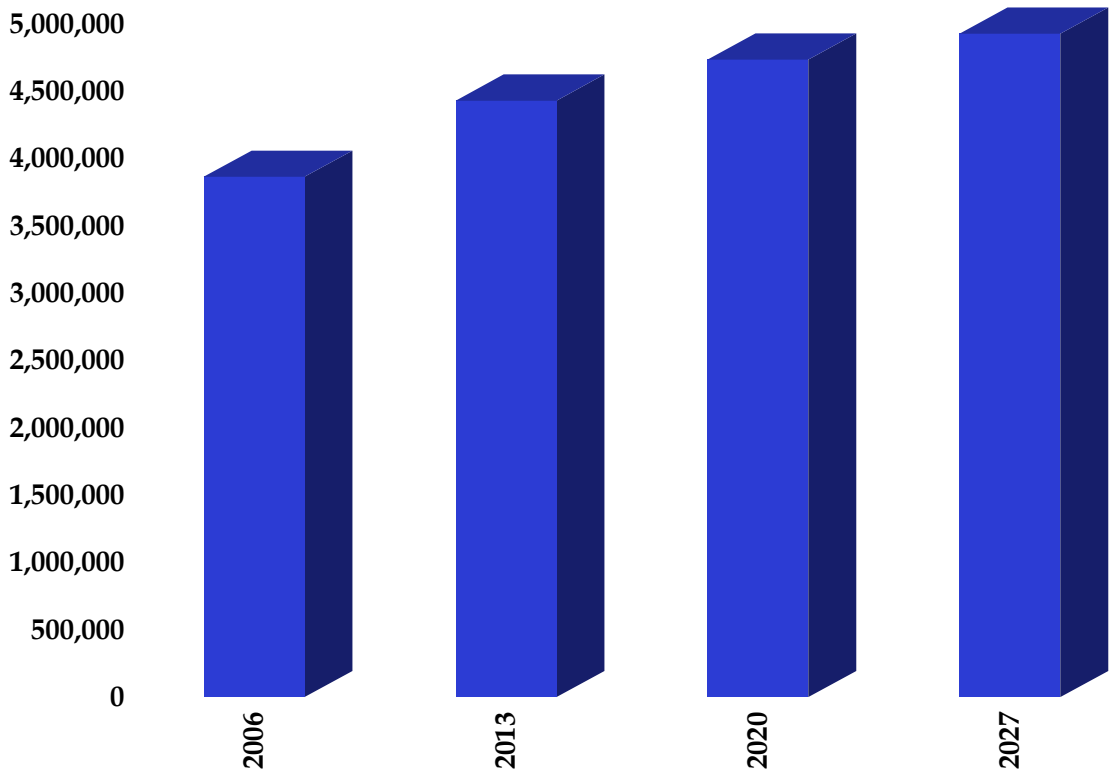
Introduction

"Today, Florida has one of the strongest economies in the world—topping three-quarters of a trillion dollars. Job growth is strong and virtually unmatched throughout the country. Personal income is on the rise. University research has joined with long-time mainstays of the economy such as the space industry and electronics to help ensure the state and its citizens keep apace with the global transformation now underway. Public universities have become one of the most productive investments of state government. Carefully tended and wisely enhanced, their assets will provide increasing benefits to future generations of Floridians."

--Board of Governors Facilities Task Force Recommendations to the Chancellor

Over the next twenty years, Florida's 18-34 population will grow by more than a million, with close to 500,000 in the next six years alone. The State University System will more add more than 50,000 students by 2012, as the generation that filled public schools in the 1990s and early 2000s works its way through college and graduate school. By 2027, the system should plan to accommodate at least another 100,000 students.

Figure 1: Projected Florida 18-34 Population Growth



To encourage more students and their families to aspire to higher education, Florida has built an education policy around the promise of access to the State University System. Three quarters of a million children are enrolled in the Florida Prepaid College plan.[vi] More than 50,000 high school graduates each year now qualify for Bright Futures.[vii] The top 20% of every high school's graduating class is guaranteed admission to a state university, as is every Associate in Arts graduate of the state's community college system.

These students expect that, when their day comes, the State University System will have a place for them and that they will have access to cutting edge instruction and facilities to enable them to meet the challenges of the global economy. But if it is to keep its promises, Florida can no longer afford a "business as usual" mentality.

In addition to expanding university facilities to accommodate projected growth, Florida needs to plan for the replacement or renovation of many of the buildings constructed for an earlier generation in the 1960s-70s. The world-class teachers and researchers Florida needs to attract will demand world-class facilities, and we must be able to compete with other states and countries that are making major investments in operating and capital funds for their university systems.

With so many competing priorities for public funds and private philanthropy, what is the case for spending on higher education facilities? Why do buildings matter? Any student, faculty member, or university president will have a different view, but will agree that physical infrastructure is critical to making higher education work. Universities exist not only to transmit bodies of knowledge but also to expand them. Facilities contribute to this mission in three critical ways:

- creating communities of teaching, learning and discovery;
- providing an environment that lends itself to interaction, collaboration, and inspiration;
- setting high standards and modeling innovation for all students and faculty, and especially those in fields such as art, architecture, engineering, materials science, urban planning, sociology, psychology and business, in which the physical environment can model—or not—the practical applications of the discipline.

Most people know from experience how workplace environment can affect job performance, either positively or negatively. The same is true for members of university communities. In a recent survey of 16,000 students from 46 different institutions, 67% of respondents indicated that the quality of facilities had been "essential" or "very important" in their selection of an institution, and half gave similar weight to the overall attractiveness of the campus. More than 29% of respondents indicated they had rejected another institution because it lacked a critical facility, 26% because of an inadequate facility, and 17% because of poor facilities maintenance.[viii]

Size and Types of Space

How big—physically—is the State University System today? At the end of the 2005-06 academic year, the system had more than 3,000 buildings with 64 million gross and 41 million net "assignable" square feet of space (equivalent to eighteen Empire State Buildings or 20,000 average single-family homes) located on 14,000 acres (about the size of Manhattan). The scale is enormous, as is the size of the student population (nearly 300,000) and the workforce (nearly 60,000) that share those facilities. Sheer size makes the State University System an essential part of Florida's educational, economic development and job creation portfolio.

Of the total assignable area, 18.8 million square feet constitutes the core working area of the universities[ix]: classrooms, teaching and research laboratories, library/study areas, and office space. Much of the rest consists of dormitories, parking garages, athletic facilities, student unions, and auditoriums that help make institutions accessible, convenient, attractive learning communities for students, faculty and staff. The "gross" square footage also includes elevators, wall space, restrooms and walkways.

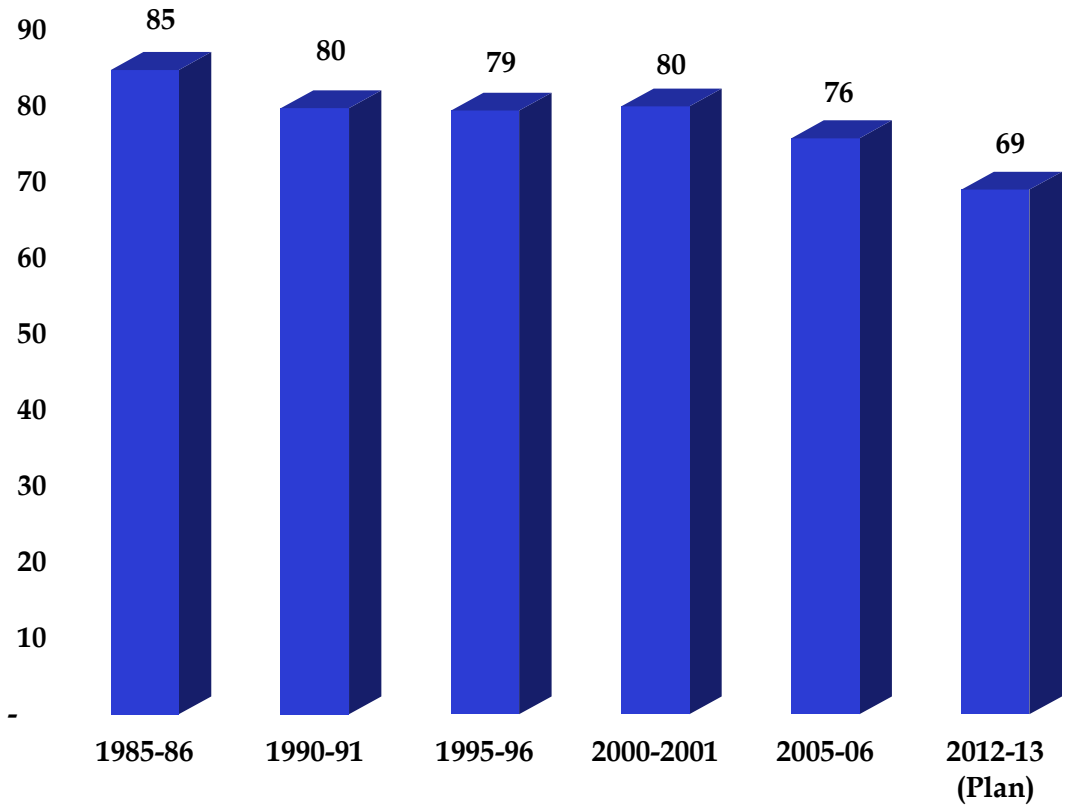
Facilities Growth since 1985-86

Since 1985-86, the size of universities' core facilities has grown by 84%, from 10.2 million net square feet to today's 18.8 million. At the same time, however, enrollment in the system has grown by 109%.

As a result, the square feet per student ratio—a key measure of the intensity of facilities usage—has declined from 85 square feet of classroom, lab, office and study space per full-time-equivalent[x] student in 1986 to 76 per student in 2006 (see Figure 2).

By 2012-13, based on projects now funded or under construction, the system will add another 11% to its core square footage. At the same time, universities will add another 19% to their enrollments, further reducing the number to 69 square feet per student.

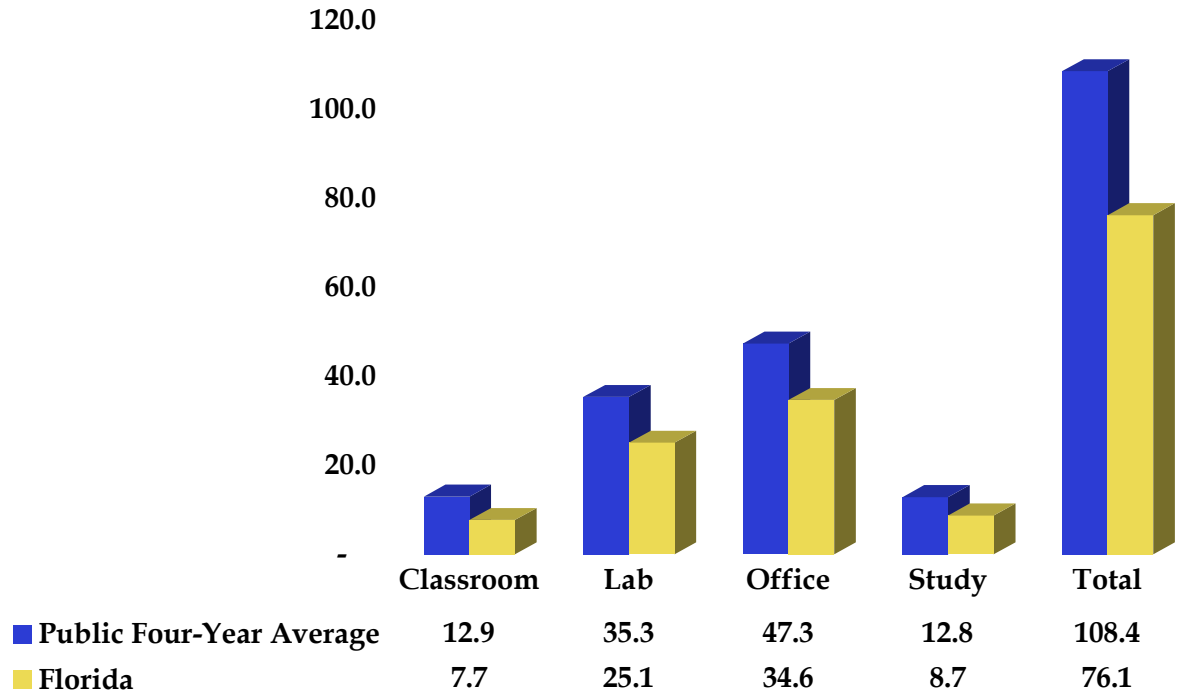
Figure 2. Square Feet of Classroom, Lab, Office and Study Space per Full-Time Equivalent (FTE) Student since 1985-86



Florida and the Nation

The decline in space per student has made Florida's system one of the most crowded in the nation. On average, the 210 public four-year institutions that participated in the 2004-05 American Physical Plant Association (APPA) facilities survey had 108 square feet of classroom, lab, office and study space per full-time-equivalent student, compared to 76 in the State University System. The SUS had fewer square feet per student in every major category[xi].

Figure 3: State University System Facilities Square Feet per Full-Time Equivalent Student Compared to American Physical Plant Association Averages[xii]



	Classroom	Lab	Office	Study	Total
Public Four-Year Average	12.9	35.3	47.3	12.8	108.4
Florida	7.7	25.1	34.6	8.7	76.1

The APPA survey participants are anonymous, but on institutional and system facilities reports, other public universities typically report much more space than their Florida counterparts. The State University System average of 7.7 classroom square feet per student, for example, is less than North Carolina (10.8), Louisiana (14.5), and Indiana (11.0). The fastest-growing universities in Florida are rapidly becoming the most cramped for space. Florida International University only has 5.8 square feet per student followed closely by the University of South Florida and the University of Central Florida, each with 6.1.

Even the newest university, Florida Gulf Coast, has only 7.4 square feet of classroom space per student. All have less space than public universities in North Carolina, Indiana, Louisiana, and Ohio. The contrast is similar with research space. Ohio State University and the University of Florida are both public land grant universities with large medical schools. Ohio State, however, has 68 square feet of research labs per student, compared to 48 at the University of Florida.

Recommendations

The obvious collision of facilities shortfalls with increasing demands means we can no longer afford a "business as usual" mentality. The recommendations in this report include much of the spirit and many of the specific ideas proposed by the facilities task force, organized under four major headings.

I. Improve Efficiency: Best Practices in Utilization, Maintenance, Construction and Design

The university system must ensure that the state property it holds in trust for the public is well-maintained and used efficiently. This is all the more important given the dearth of space to accommodate planned growth. The university task force identified a number of areas in which efficiencies can maximize the return on investment in current and future facilities.

A. Use Space More Efficiently

A March 2006 report by the Florida Legislature's Office of Program Policy Analysis and Government Accountability (OPPAGA) identified several strategies universities and community colleges could use to increase classroom utilization rates, including quota systems, internal benchmarking and reporting, and tuition discounting. All of the strategies included in the report should be seriously considered and universities should be given flexibility to implement pilot programs to test different approaches. In particular, the system should implement the following recommendations:

1. Conduct a thorough utilization review

As part of the overall facilities review recommended in this report, a comprehensive study of space utilization should identify ways to maximize the use of current classroom, laboratory, and office space. The study should review the scheduling of instructional and non-instructional activities that take place on campus and what can be done to maximize savings on total operating and capital expenses by changing schedules, revising room use, creating incentives, or making better use of technology. The study should include development of a methodology for accurately capturing complete usage data, including space usage on branch campus and joint use facilities.

2. Establish high standards

Consistent with the recommendations of the OPPAGA report, the system should establish the highest possible standards for classroom utilization and incorporate them into calculations of need for new facilities. An annual, as opposed to weekly, standard

for utilization should be considered in order to encourage creative use of space throughout the calendar year. Learning is life-long, research is continuous, and our universities should be more accessible each day every year.

3. Give universities policy flexibility, including differential tuition authority

In order to maximize utilization, universities should be given broad flexibility to experiment with different approaches to scheduling, including the authority to discount tuition for courses in underutilized time slots or locations. It is important to remember that, over the life span of a building, operating costs will far exceed the capital investment, and universities also need to consider the impact of space-saving measures on operating expenses and revenues. With the authority and flexibility to test new policies, institutions will be better able to determine the best potential for both operating and capital savings.

FIU School of Music[xiii]

B. Streamline Planning, Design and Construction Processes

1. Revise the educational plant survey process

A Plant Survey Work Group should convene to recommend process improvements and improve the accuracy of both the Space Needs Generation Formula and the calculation of space eligible for fixed capital outlay budgeting. The group should provide a report of its recommendations no later than June 15, 2007, with the goal of implementing as many possible improvements in the 2007-08 year.

2. Streamline the capital improvement plan budget request

Board of Governors staff should streamline elements required as part of the annual legislative budget request process, discontinue unneeded forms, update and improve the submission process; and clarify policy that allows inflation adjustments to the annual five-year capital improvement plan. These revisions will be reflected upon the next issuance of the capital improvement plan preparation instructions.

3. Accelerate fixed capital outlay funding releases

Board staff should work cooperatively with the governor's office to develop a process to permit more timely and equitable release of funds, so that the State University System does not incur avoidable process delays which add to the ultimate project cost.

Currently, all fixed capital outlay appropriations are given an automatic 20% release of spending authority on July 1st. The Department of Education budget office then authorizes encumbrances on a first-come, first-serve basis. As soon as possible, a budget amendment is submitted to the governor's office to obtain the remaining 80% of release. Until the budget amendment is authorized, however, the Department of Education may not issue encumbrance authorizations, and the university may not enter into any planning, design or construction contracts.

4. Increase the funding limit for minor projects

Regardless of the total amount of capital funds appropriated, the legislature should increase the limit for construction projects in this category from $1 million to $2 million in the upcoming 2007 session. Minor project authority allows the university to make incidental repairs and minor renovations without obtaining specific legislative approval. The university task force determined that raising the current threshold from $1,000,000 to $2,000,000 would allow the more timely correction of common safety problems and hazardous conditions that are detected throughout the year.

5. Streamline sales tax exemption process for building materials

The system should consider supporting a proposal that streamlines the process of obtaining an exemption from the state sales tax on building materials purchased for university construction. Many contractors do not use the current exemption process because it is too complicated.

C. Revise Plant Operations and Maintenance (PO&M) Processes

1. Request operation and maintenance funding for leased space

Board of Governors staff should consider appropriate parameters for the inclusion of leased space in our legislative budget request for plant operations and maintenance funding of education and general facilities.

2. Allow corrections to previous funding requests

Board of Governors staff should continue to allow for corrections in order to modify the amount of plant operations and maintenance funding depending on the timeframe involved. Consideration for making adjustments in the legislative budget request is given to requests to correct errors made within the last five years.

3. Allow changes in intensity of use due to renovations

Plant operations and maintenance funds should reflect buildings' current use. When a building is renovated for the purpose of changing its use or upgrading it for a special purpose (converting office space to a laboratory, for example), consideration will be given to requesting plant operations and maintenance funding based on the facility's current use, regardless of the age of the facility.

4. Request funds for space converted to education and general (E&G) use

Board of Governors staff should continue to allow plant operations and maintenance funding to be requested for a non-E&G facility (a dormitory, for example) that was originally ineligible for funds but that has been converted to space utilized for education and general purposes (such as a classroom building) provided that the facility has prior legislative approval.

5. Adjust operating costs for existing buildings for inflation

Inflation in operating costs for existing buildings should be taken into account in plant operations and maintenance funding requests. One method of doing this could be to take the total education and general gross square footage at each institution and apply the same incremental funding increase each year that is applied to the base cost factor for new space.

6. Change indexes used for increasing base cost factors

Alternative sources for cost adjustment should be evaluated. Currently, adjustments are made each year according to consumer price index information (for utilities and operations and maintenance) obtained from the U. S. Department of Labor, Bureau of Labor Statistics. Board of Governors staff will work with university personnel to evaluate alternative sources and incorporate appropriate changes.

II. Invest in the Next Generation: $3.4 Billion in Capital Funding for Quality and Access

The state currently has no comprehensive plan and virtually no budget to finance new construction in the university system. If the current business model is maintained, only 7% of needed new space will be funded by 2013. A new generation of students will be short-changed with an infrastructure that is barely meeting minimum standards of quality and competitiveness.

At current construction costs it would take $3.4 billion to fund the space needed for the 350,000 students the system plans to enroll by 2012-13. This figure is based on average needs of 119 gross square feet per student at $250 per square foot. Appendix 1 includes more detail. The thorough assessment recommended in this report is an essential step to providing more precise parameters for the need, but this figure conveys the magnitude of the challenge the system confronts.

In the past, the lion's share (86% in 2005-06) of state funding for instructional space came from the Public Education Capital Outlay (PECO) program, which allows bonding of taxes on utilities and communications services. PECO was constitutionally established in 1963 to provide for the acquisition, construction, maintenance and renovation of instructional space for community colleges and state universities. It was expanded in 1974 to include public schools.

Current revenue projections for the 2006-2007 academic year indicate that funds from Public Education Capital Outlay (PECO) will barely cover basic maintenance and the completion of the 46 projects that have already started. The Board of Governors' legislative budget request for 2007-2010, is just $526 million, short of the estimated university need by over $2 billion. The remaining 220 projects in the official planning pipeline will compete for whatever funds are available starting in 2010-2011. Most stand little chance of funding before 2013.

A. Conduct a Needs Assessment

The system should conduct an immediate, independent assessment of its essential facilities and infrastructure needs, similar to that conducted by states such as North Carolina, New York, Michigan, and Maryland.

No matter the direction the Board chooses pursuant to the recommendations of the Pappas Group, which is currently evaluating long-term options for the overall structure of the State University System, a capital needs assessment will be an essential first step in giving material form to the state's strategic priorities. In addition to the Board of Governors and State University System officials, the Governor, President of the Senate and Speaker of the House will be critical partners in the assessment process and the regular ongoing communications associated with this effort.

B. Implement New Funding Mechanisms for Critical Space Needs

Upon completion of the assessment, the Board should work with key stakeholders to identify the most appropriate mechanisms to fund projects deemed essential to the State University System. Options to consider include:

- **One-time appropriation** of non-recurring general revenue, lottery or other available existing state resources.
- **Expansion of the existing facilities matching funds program**, with incentives to encourage gifts that support the projects most critical to the state's strategic priorities. Currently, all donations are treated equally when requesting matching grants from the state.
- **Imposition of a tax on tobacco companies** that were not part of the original 1997 settlement that recovered smoking-related health care costs. A portion of this tax could be specifically directed toward construction of university health care and related research facilities. A 40 cent per pack tax with a 10% set-aside would provide over $10,000,000 annually.

UCF Student Union[xiv]

- **Bonding of existing revenue,** following the model of other states that have made strategic investments in higher education. One option proposed by the facilities task force would be to decrease the sales tax on communications services by one percentage point, and increase the Gross Receipts tax by one percentage point. While having no effect on the taxpayer, this proposal, if adopted, would create $2 billion in bonding capacity for the State University System.

- **Leveraging of indirect costs from sponsored research** and other funds associated with revenue-generating operations**,** to secure financing for construction. With most types of external research funding, universities receive a percentage of the funds to subsidize the indirect costs of performing the activity, including facilities costs. Funds may also be available from revenue-generating activities (e.g., patient care, continuing education, or leasing of space to business partners) to support construction and maintenance costs.

C. Update the Funding Source for Student Auxiliary Facilities

Over a five year period, the Building and Capital Improvement Trust Fund fees that pay for student auxiliary facilities should be raised to $8 per credit hour and thereafter indexed to the Building Cost Index published in the Engineering News Record.

Student unions and athletic facilities are not generally included in the Public Education Capital Outlay budget request, but are funded through mandatory student fees of $4.76 per credit hour. These fees have not increased since 1988, although it would take more than $8 today to provide the same purchasing power.

There is a growing consensus that recruitment and retention of both students and faculty is linked to the sense of community provided by both the co-curricular and extra-curricular opportunities. Students are demanding improved amenities such as student unions, gyms and stadiums, which the current fee does not adequately support.

III. Preserve Florida's Investment: Maintaining and Improving Current Facilities

The oldest buildings in the State University System (historic facilities owned by the University of West Florida and the University of South Florida) date to the mid-nineteenth century and the newest buildings are still under construction. The peak of building in the system followed the establishment in the 1960s of five new universities: Florida International, Florida Atlantic, the North Florida, West Florida, and Central Florida. More than 25% of the system's current core academic space was built in a single decade, from 1967-1976, and 5% of all classrooms, labs, offices and study space were completed in 1967 alone (see Table 1).

Much of this space is reaching an age when it will need to be extensively renovated or replaced. More than 40% of space built in the 1960s and 1970s has yet to undergo renovation, as does 30% of the space completed in the 1950s. Facilities can quickly become outmoded, especially in fields with rapidly advancing technology. In some of these fields, the amount of information available is doubling every two years. If the facilities support does not keep up, our students will not be adequately prepared when they graduate.

It would cost approximately $30 billion to replace all the buildings on the system's campuses, which makes it critical to extend the useful life of buildings when possible. Remodeling projects can transform outdated space and preserve the architectural heritage of our campuses, but they cost a significant fraction of the replacement value and are less attractive for private donors than new buildings. The cost to bring universities' current core operations space up to satisfactory condition is estimated at $650 million, with the total critical deferred maintenance needs of universities (including all buildings, roads, parking, etc.) estimated at more than $1 billion, based upon a system-wide independent review in 1997.

Replacement is also an option that will have to be considered if high quality facilities are a priority. While there are many useful buildings from the 1960s and 70s—and some with important historic and aesthetic value—many believe those decades were not public architecture's finest hour and do not represent the face the system should be presenting to the world. In a commentary on the University of California at Berkeley's Barrows Hall, critic Todd Gitlin notes how such buildings embodied the idea of "American civilization as grid, as calculated order," but left their inhabitants uninspired and anxious to leave.[xv] It is important to remember in designing and preserving buildings that they represent the current generation's physical legacy to the future.

Table 1: SUS Core Facilities by Decade of Construction

Building Construction Decade	Core Square Feet (Thousands)	Percent of Core Square Feet
Pre-1900	5	0%
1900-1909	43	0%
1910-1919	237	1%
1920-1929	274	1%
1930-1939	332	2%
1940-1949	417	2%
1950-1959	1,426	8%
1960-1969	3,623	19%
1970-1979	3,482	19%
1980-1989	2,447	13%
1990-1999	3,941	21%
2000-2006	2,587	14%
Grand Total	**18,813**	**100%**

How will we pay to retrofit or replace these "baby boomer" facilities? We are approaching the moment when Public Education Capital Outlay revenues will be entirely devoted to minimal maintenance of the existing buildings and support infrastructure, and will be insufficient to protect the state's investment in the system's physical plant.

In addition to supporting new construction, PECO funds have also been the major source of financing for significant remodeling projects. Section 1013.64 of Florida Statutes requires that "funds for remodeling, renovation, maintenance, repairs, and site improvement for existing satisfactory facilities shall be given priority consideration by the Legislature." The funds appropriated pursuant to this statute, however, have not been sufficient to keep up with needed repairs and renovations and have fluctuated substantially over the course of the business cycle. While the statutory formula for "Maintenance, Repairs, Renovations, and Remodeling" indicates $150 million was needed in 2006-07, only $36 million was allocated to maintain the existing facilities and related infrastructure, based on non-bonded available PECO funds. Legitimate competing demands for instructional and research space have overshadowed this essential but often neglected component of the building cycle.

A two-part solution will greatly accelerate the system's critical agenda for maintenance and renovation:

A. Amend the 2007-2008 Budget Request

As a first step, the 2007-2008 budget request should be amended to include an additional $140 million from non-recurring general revenue, thus funding the statutory formula for repairs and renovations. This would provide immediate support prior to establishment of a dedicated funding source as recommended below.

B. Allocate a Portion of Documentary Stamp Taxes to Capital Renewal

Legislation should recognize the State University System's growth and impact by directing 2.25% of the documentary stamp tax proceeds to university capital renewal.

Currently, Chapter 2005-290, Laws of Florida, provides $750 million annually to fund specific transportation, school, and water projects. In this case, state policy recognizes the severe strain continuing population growth has created on the underlying support infrastructure and the state institutions charged with maintaining it.

The law directs $575 million to the State Transportation Trust Fund, $100 million to the Water Protection and Sustainability Program Trust Fund, and $75 million to the Public Education Capital Outlay and Debt Service Trust Fund from documentary stamp tax collections. However, the PECO dollars thus provided are currently earmarked only for facilities within high growth public school districts. The policy rationale for these earmarks should also justify support for the state universities, which are subject both to population growth and to the expectations generated by the state's priority on access and economic development.

IV. Lead the Nation in Sustainability: Cutting-Edge Research, Engineering, Architecture and Planning

Most state universities have already incorporated some elements of a sustainability program in their facilities or academic operations. The most comprehensive new initiative in the SUS is at the University of Florida, which recently hosted a national conference on the issue, and which has constructed an award-winning facility to house its building construction program (see figure 4). Other national leaders in campus sustainability include both public and private institutions and systems such as the University of South Carolina, the University of California System, Yale, and MIT. In South Carolina, for example, a consortium of public institutions collaborates on sustainability initiatives and awards small grants to faculty and facilities managers for both research and practical initiatives related to campus environmental impacts.

A. Adopt Policies that Promote Sustainability

In consultation with academic and facilities experts around the state, the Board should incorporate sustainability in the guidelines for the capital budget request, including minimum standards for all projects to be recommended in the Board's legislative budget request and additional priority status for projects that exceed the minimum.

B. Recognize Institutional Achievements

Every year, the Board should recognize the top two university achievements in sustainability in each of three domains: 1) new construction, 2) renovation, and 3) campus operations. Such an award would raise the statewide profile of these important efforts.

C. Continue the Concurrency Trust Fund

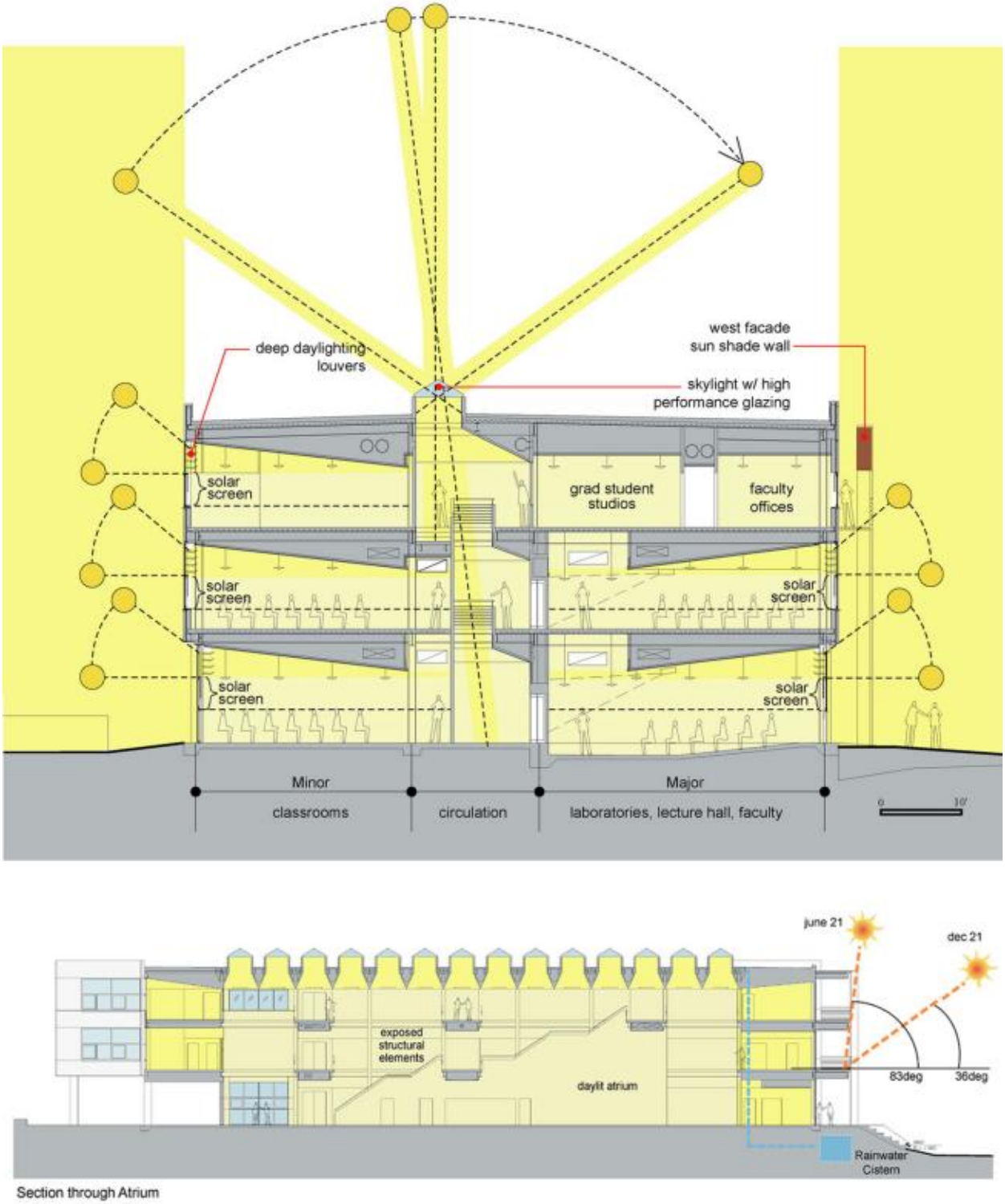
The State University System should make a concerted, coordinated effort to ensure the continuation of this trust fund. Board staff should draft language for the Board to recommend in the upcoming legislative session to reinstate the previous dedicated revenue stream for this fund effective July 1, 2007.

The principle of "concurrency" is that development should not negatively impact existing communities. Universities should be setting the highest standards for good local citizenship in this regard. The state has formally recognized (in section 1013.30, Florida Statutes) that while university campuses provide research and educational benefits of statewide and national importance, they may have an adverse impact on the public services and natural resources of the host community. Special growth management provisions have therefore been adopted that supersede the regulations for land development.

Historically, the costs associated with this concurrency requirement have been provided via the University System Concurrency Trust Fund. This provides a funding mechanism for the university to be a "good neighbor" and meet its "fair share" of the costs of its impact on public facilities and services, including roads, sanitary sewer, solid waste, drainage/stormwater management, potable water, parks and recreation and public transportation.

This cornerstone of sustainability is now in jeopardy. The revenue previously directed to the fund was eliminated as of July 1, 2006 and the fund itself is scheduled for termination on July 1, 2007.

Figure 4: Cross-section showing energy features of University of Florida's Rinker Hall



Relatively small investments in sustainable facilities such as the University of Florida's award-winning Rinker Hall, which houses its School of Building Construction, lead the field in conserving operating costs and reducing negative impacts on the environment.

Conclusion: Moving Forward

Changing course will take a collective effort. If we are to exchange "business as usual" for a shared vision of quality and access, we will need the involvement and commitment of students, parents, faculty, and the academic and political leadership of the state.

This report is a call to immediate action. Parts of the plan outlined in this report can begin now, as universities and the Board of Governors office implement policies to make the system work more efficiently. Other elements will require action in the 2007-2008 legislative session to reinvigorate the system's maintenance and renovation programs. Finally, the comprehensive review of system facility needs—which will take no more than 12-18 months to complete—should serve both to provide critical information and to stimulate the state's interest in making long-term investments in higher education. We can no longer afford to wait.

Appendix 1: Calculation of 2012-13 Projected Need

Planned 2012-13 Enrollment (Fall Headcount Estimate Based on FTE Plans)	**349,122**			
	Net Assignable Square Feet Per Student*	Projected Need (Square Feet Per Student x Planned Enrollment)	Current Space Inventory and Funded Space in Pipeline	***Difference: Space Deficit by 2012-13***
Classroom	7.6	2,656,635	2,039,490	*617,145*
Teaching Lab	9.6	3,351,257	2,600,358	*750,899*
Study	12.8	4,469,463	2,105,603	*2,363,860*
Research	13.4	4,687,516	3,501,029	*1,186,487*
Office	31.3	10,910,799	7,306,820	*3,603,979*
Auditorium/Exhibition	2.1	723,265	549,953	*173,312*
Instructional Media	0.7	248,249	114,202	*134,047*
Academic Support	0.4	135,299	84,832	*50,467*
Gym	3.4	1,170,237	759,170	*411,067*
Support Services	4.1	1,417,638	883,219	*534,419*
Total Net Square Feet	**85.3**	**29,770,358**	**19,944,677**	***9,825,681***
Gross Square Feet (Net Square Feet x 1.4)	**119.4**	**41,678,501**	**27,922,548**	***13,755,953***
Estimated Project Cost Per Gross Square Foot				***$250***
Cost to Meet Projected 2012-13 Need				***$3,438,988,350***

*Note: These are systemwide averages per student enrolled in fall. The space needs formula uses more detailed factors for each institution's planned full-time-equivalent enrollment.

Appendix 2: Facilities Task Force Participants

Mr. William Merck II, Facilities Task Force Chair
Vice President for Administration & Finance
University of Central Florida

Committee on Revenue

Dr. Robert Bradley, Committee Chair
Interim Vice President for Academic Quality and External Programs
Florida State University

Dr. David Denslow
Director, Economic Analysis Program
University of Florida

Ms. Debi Gallay
Associate Vice President for Education Policy and Budget
Florida International University

Dr. Curtis Bullock
Executive Director of FGCU Financing Corporation (Direct Support Organization)
Florida Gulf Coast University

W. Scott Cole, Esq.
Vice President and General Counsel
University of Central Florida

Mr. Frank Brogan
President
Florida Atlantic University

Committee on Process and Procedures

Mr. Victor Citarella, Committee Chair
Associate Vice President, Division of Administration
Facilities Management Department
Florida International University

Janet Owen, Esq.
Vice President for Governmental Affairs and Associate General Counsel
University of North Florida

Dr. Renu Khator
Provost and Vice President for Academic Affairs
University of South Florida

Dr. Debra Austin
Provost and Vice President for Academic Affairs
Florida A & M University

Mr. Bert Hartley
Interim Vice President
University of West Florida

Dr. John Cavanaugh
President
University of West Florida

Mr. John Martin
Vice President for Finance and Administration
New College of Florida

Dr. Hui-Min Wen
Director, Institutional Research
New College of Florida

Dr. Larry Abele
Provost and Executive Vice President, Academic Affairs
Florida State University

Mr. Tom Donaudy
Associate Vice President and University Architect
Florida Atlantic University

Committee on Best Practices

Dr. Joe Shepard, Committee Chair
Vice President for Administrative Services
Florida Gulf Coast University

Ms. Carol Walker
Director, Facilities, Planning & Construction
University of Florida

Mr. Clarence (Tony) Stallworth
Associate Vice President Construction and Facilities Management
Florida A & M University

Mr. Zak Ovadia
University Facilities Planning
University of North Florida

Dr. Ralph Wilcox
Vice Provost for Policy Analysis, Planning and Performance
University of South Florida

Focus Group

The task force held a focus group meeting with the Association of Building Contractors (ABC), Associated General Contractors (AGC), and the Florida president of the American Institute of Architects (AIA). In attendance were:

Vivian Salaga
President of Florida AIA

American Building Contractors (ABC) of Florida, Inc., represented by:

Rick Watson
Legislative Counsel

Rex Kirby
Suffolk Construction, West Palm Beach

Kyle Kovacs
Elkins Constructors, Jacksonville

David Lewis
Wharton Smith Construction, Orlando

Associated General Contractors represented by:

Tom Murphy
Wharton Smith Construction Group

Ed Parker, Jr.
Biltmore Construction

Notes

[i] £500 million. See http://www.cam.ac.uk/building/

[ii] *Chronicle of Higher Education.* Special coverage of campus architecture. See http://chronicle.com/indepth/architecture/

[iii] Photo copyright Samuel Asarnow. Used with permission.

[iv] BOG Staff analysis of facilities data in American Physical Plant Association survey, 2004-2005. SUS data from Facilities Master File (2005-06).

[v] *State University System Fact Book, 2004-05.* Table 41

[vi] *Florida Prepaid College Board 2004/05 Annual Report.* Page 4.

[vii] *Office of Student Financial Assistance Report to the Commissioner, 2004-05*. Page 24. https://www.floridastudentfinancialaid.org/SSFAD/pdf/annualreport04-05.pdf

[viii] Cain, David, and Gary Reynolds. "The Impact of Facilities on the Recruitment and Retention of Students." *Facility Manager.* March/April 2006. Page 54.

[ix] Data on the core areas of the system are much more consistent over time and with other institutions around the country than with some of the peripheral and support facilities. The core areas are also the most critical to a university's mission and, unlike parking garages and dormitories, are not generally self-supporting.

[x] The national standard FTE definition of 30 credits/undergraduate and 24/graduate has been used to facilitate comparisons with other states. The trend data here relate to space eligible for capital outlay funding, consistent with historical SUS records. For national comparison purposes, however, all space, eligible and ineligible, was included, resulting in slightly higher numbers of square feet per student. If only eligible space were included, Florida would be farther below the national norms.

[xi] The survey combines teaching and research labs.

[xii] Source: American Physical Plant Association Survey (2004-05), average of all public baccalaureate and higher institutions. SUS data from Facilities Master File (2005-06)

[xiii] Photo: Alfonso Surroca. Creative Commons Attribution Noncommercial Share-Alike License 2.0.

[xiv] Photo: Kevin Morris. Creative Commons Noncommercial Attribution License 2.0.

[xv] "Berkeley's Right Angles," *The American Scholar,* Autumn 2000.

Reviewing the State of Deferred Maintenance

by Harvey H. Kaiser

[Ed. Note: This article is developed from research in progress by the author on an APPA Center for Facilities Research (CFaR) project. The project on "Facilities Reinvestment" will examine the state-of-the-art in addressing capital renewal/deferred maintenance and result in a book with findings and a recommended planning process to gain support and funding for CRDM. In this article, Kaiser sets forth some basic principles that will form the framework for the research and the eventual recommendations.]

The Issues and Challenges

Higher education has historically underfunded maintenance of capital assets. Compounded by an asset portfolio of aging facility and infrastructure, inadequate funding for replacements of building systems and modernizations for current and new functions, and changing pedagogy, colleges and universities accumulate backlogs of capital expenditures, often at the risk of institutional financial equilibrium. Under these conditions, campus buildings and infrastructure are subject to potential critical failures and disruption to normal activities, threats to health and life safety, inadequacies to support intended programs, deterioration in campus appearance, and a reduction in capital asset value. Taken together, these circumstances are grouped in the general term "deferred maintenance."

Deferred maintenance issues are summarized as:

- Piecemeal approach to capital planning without linkages between strategic and operational planning;
- Chronic resource shortage;
- Inadequate management policies and practices, plus internal politics;
- Misunderstood and misapplied needs assessment methodologies and tools;
- Unrealistic financial planning; and
- Lack of performance measures.

Understanding the deferred maintenance liability requires documentation of the causal factors, and includes the impact of underfunding annual operating budgeting for maintenance and replacement of building and infrastructure at the end of a life cycle, and the gap between funding required for adequate capital asset maintenance and reinvestment. Although some public systems of higher education and individual institutions

Harvey Kaiser is president of Harvey H. Kaiser Associates, Inc., based in Syracuse, New York. He is the author of* The Facilities Audit: A Process for Improving Facilities Conditions, Mortgaging the Future: The Cost of Deferring Maintenance, *and the coauthor of* A Foundation to Uphold: A Study of Facilities Conditions at U.S. Colleges and Universities. *He can be reached at hhkaiser@att.net.

TABLE 1: BUILDING DATA ELEMENTS

Institutional identifier - FICE or IPEDS	Number of floors
Site identifier - institutional code	Estimated current replacement cost
Location or street address	Original building cost
Building identifier - local name	Cost of major renovation(s) - amount and date
Ownership status - owned, leased, etc.	Historic preservation status
Gross building area - gross square feet (GSF)	Type(s) of construction
Net assignable area - net square feet (NASF or ASF)	Disabled access
Year of construction - completion	Fixed equipment
Year of last major renovation	Building condition & functionality *(see Tables 6 & 7)*

have addressed these problems aggressively in recent years, many struggle with identifying their needs and presenting a persuasive and credible argument for financial support necessary to restore deteriorating and/or remedy unsafe conditions.

There are two major challenges in addressing deferred maintenance: 1) a consistent and commonly applied definition of deferred maintenance; and 2) a capital planning process identifying and integrating all campus capital needs. The basic definition of deferred maintenance is: *maintenance and repair deficiencies that are unfunded at the end of the fiscal year on a planned or unplanned basis and are deferred to a future budget cycle or postponed until funds are available.*

However, sometimes, estimates of campus "deferred maintenance" mistakenly includes major repairs and replacements for facilities more appropriately categorized as life cycle capital renewal, facilities modifications for change in use and upgrades to meet contemporary use standards, and regulatory requirements to meet environmental and life safety codes. Thus a "deferred maintenance backlog" is erroneously presented as the sum of several categories, in addition to the appropriate need to remedy existing physical conditions, by including annual life cycle renewal for facilities systems reaching the end of their useful life, and modernization/upgrade capital requirements.

A capital planning process, integrated into a long-range capital development plan by a strategic facilities planning process, comprehensively identifies capital requirements for all campus building and infrastructure based on needs assessments for *capacity* (enrollment, program), *condition and functionality* (immediate condition deficiencies and modernization/upgrades), and *regulatory needs* (environmental and life safety codes). An additional component of a capital program is a forecast for annual life cycle renewal needs, to form a comprehensive list of capital projects for prioritization and funding allocation strategies.

Data Elements

Data elements for analyses to address capital needs, including the deferred maintenance component, are based on methodology and tools for assessments of capacity, condition

Continued on page 18

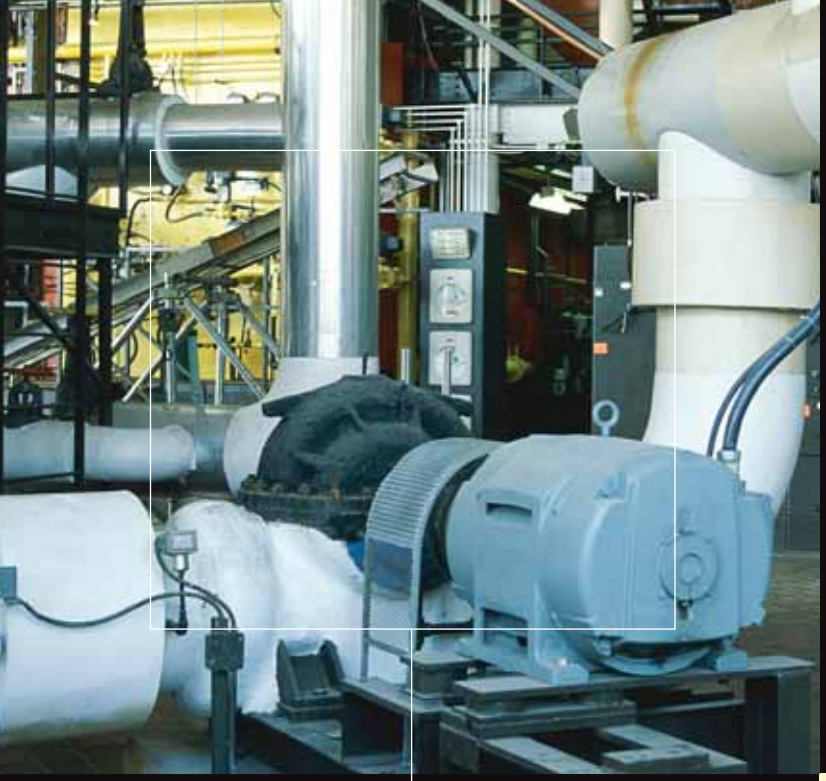


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TABLE 2: ROOM DATA ELEMENTS

Institutional identifier - FICE or IPEDS	PEFIC Room Use Code - primary use, % use
Building identifier - local name	PEFIC Room Use Code - secondary use, % use
Unique space or room identifier - name, ID number	Assignable area - NASF or ASF
Organizational unit - name or code	Capacity - number of stations
CIP Discipline Code	Condition and functionality/suitability *(see Tables 6 & 7)*
Program Classification Structure	Disabled access

Continued from page 15

and functionality, and forecasted life cycle renewal. A comprehensive facilities database includes data elements required for needs assessments at levels of building and room. Data is either numerical, narrative, or both.

Sample Methodologies

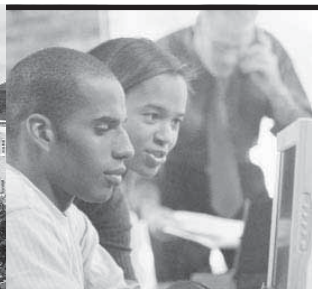
Methodologies and tools are applied for 1) a capacity analysis, 2) condition needs assessment, 3) functionality needs assessment, and 4) a life cycle renewal forecast.

Capacity Analysis

A capacity analysis uses space planning and utilization standards to predict how much space, expressed in assignable square feet (ASF), is required for each space type (PEFIC Room Use Code). Then, by comparison of the *required* amount of space with the actual amounts of space, the *capacity analysis* permits conclusions about *surplus* or *deficit* of space, by space type.

Condition Needs Assessment

The assessment of *physical condition* needs is a two-part exercise to determine the current observable deficiencies and a prediction of future needs based on life cycles of building systems and components. Current deficiencies are those that are defined as immediate or critical because of failure or those with a high potential in the next 12-24 months. Thus, needs can be identified as deferred maintenance backlog because of a failure to take remedial action within past or current budget cycles or critical because of an imminent need for funding remedial action.

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Director, Physical Plant and Facilities Planning
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TABLE 3: NON-FACILITIES DATA ELEMENTS

Division
College/School
Department
CIP Discipline Code
PEFIC Room Use Code
Classroom/Laboratory
- Section #
- # of students
- Course name
- Weekly schedule
- Contact hours
- Enrollment limit
Room assignment
Student Data
- Headcount
- Full time equivalents
- Affiliation—division, college/school, department

Employee Data - Classification (EE06)
- Headcount
- Full time equivalents
- Affiliation - division, college/school, department
- Classification - Admin., Faculty/Professional, Technical/Clerical, Graduate Assistants, Student Employees
Research Data
- Division
- College/School
- Department
- CIP code
- Recent research expenditures - three-year average
- E & G current fund expenditures - three-year average
Library Data
- Library volumes - ACRL conversion method

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...sportation and circulation
...Vayfinding
Disabled access
Utility Type:
- Electric power - r...
emergency
- HVAC
- Natura...
oth...
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TABLE 5. SAMPLE SURPLUS/DEFICIT CALCULATION

Campus	FTEs (Student)	Actual ASF	Predicted ASF	Surplus (Deficit) ASF	% Variance from Predicted

There are alternative techniques for determining physical condition needs, with varying reliability and cost. Specific circumstances can dictate the selection of an appropriate methodology.

- *Qualitative Analysis*—a building walk-through is recorded as ratings (excellent, good, fair, poor, and unsatisfactory). The rating is converted as a ratio of the observed condition to an "excellent" condition and then multiplied by a current replacement value to determine the cost of a remedial action (lowest cost, moderate reliability).
- *Deficiency-Based Systems*—a comprehensive physical inspection performed on regular cycles, identifying observed deficiencies (condition and functionality) (highest cost, highest reliability);
- *Predictive modeling*—an assessment of facility-system level condition through its life cycle (lowest cost, moderate reliability); and
- *Engineered Management Systems*—an assessment of asset performance combining predictive life cycle modeling and a disciplined observation of current asset performance (moderate cost, highest reliability).

The deficiency-based approach (or facilities audit) is conducted as a comprehensive building-by-building inspection of spaces and operating systems on an average three-year cycle for all facilities. Various field methodologies are based on UNIFORMAT II (Uniformat II Elemental Classification for Building Specifications, Cost Estimating, and Cost Analysis, NISTIR 6389. Washington: Department of Commerce, National Institute of Standards and Technology, 1999). Actual inspections can be conducted using a spreadsheet template or computer data entry. Goals for the inspection are to

TABLE 6. CONDITION NEEDS ASSESSMENT DATA COLLECTION TEMPLATE

Inspection Data	System/Component Evaluation
- Facility Identifier - location, number, name	- Deficiency identifier - name, number
- UNIFORMAT II element category	- Deficiency description
- Inspector name	- Priority rating - level 1 (years 1-5), level 2 (years 5-10)
- Inspection date	- Estimated cost
- System/Component Condition Description	- Special Conditions

TABLE 7. FUNCTIONALITY NEEDS ASSESSMENT DATA COLLECTION TEMPLATE

Building Template

1. Functional relationships
2. Architectural
3. HVAC
4. Electrical service
5. Plumbing
6. Lighting
7. Data and telecommunications
8. Acoustics/sound and vibration control
9. Furnishings
10. Major equipment
11. Code compliance - accessibility, environmental, etc.
12. Historic preservation status
13. Safety and security

Room Template

1. Functional adequacy
2. Room/space finishes
3. Climate control
4. Electrical service
5. Lighting
6. Data and telecommunications
7. Special services
8. Acoustics/sound and vibration control
9. Furniture and fixtures
10. Code compliance
11. Accessibility
12. Safety and security

identify routine maintenance items for annual operating budget expenditure and major repairs/replacements for two years (current year and next year capital budgets. Each major repair/replacement project should be estimated for current year and inflated costs to remedy deficiencies and prioritized for a five- to ten-year capital program.

Functionality Needs Assessment

Data is collected and evaluated for an estimate to correct functionality deficiencies using a template for buildings and rooms, the latter based on the specific functional assignment for a PEFIC Room Use Code.

Condition, functionality, and regulatory needs are combined into a Facilities Needs Index (FNI), a baseline metric for future performance evaluation and benchmark comparisons with other facilities and institutions. The FNI is expressed as

$$\text{FNI} = \frac{\text{condition needs} + \text{functionality needs} + \text{regulatory needs } \textit{(times \%)}}{\text{current replacement value}}$$

[*Ed. Note:* See also Cain & Kinnaman, "The Needs Index: A New and Improved FCI," March/April 2004 *Facilities Manager.*]

Life Cycle Renewal Modeling

Life Cycle Renewal modeling utilizes factors of building systems or components estimated life along with current age and previous expenditures for improvements. Used as an independent analytical tool, the predictive (or life cycle model) provides a life cycle renewal forecast for systems with a 25-year life span (or longer). The predictive model forms the engineered management system approach which is used to identify building systems or components identified as close, at the end, or past the end of a life cycle for a facility-targeted, deficiency-based detailed assessment.

The predictive model also can be the basis of an annual renewal allowance in either an operating or capital budget. The allowance's purpose is to offset life cycle deterioration and serves to prevent an accumulation of capital repair/replacement backlog. **The allowance is in addition to a facilities operations and maintenance annual operating budget.** Data elements required for a life cycle renewal forecast, in addition to building data elements (Table 1), include an estimated theoretical life for facility systems and components.

Used as an independent analytical tool, the predictive (or life cycle model) provides a life cycle renewal forecast for systems with a 25-year life span (or longer).

Conclusion

Addressing deferred maintenance is a fundamental responsibility of the facilities management professional. Required is an understanding of the definitions and methodology to develop a credible and persuasive capital planning process. Integration into a long-range capital development case for funding and implementing a program to reduce deferred maintenance in order to offset future facilities deterioration and sustain functional facilities in support of institutional mission is also a requirement.

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Facilities Can Play Key Role in Students' Enrollment Decisions, Study Finds

By Audrey Williams June
CHRONICLE OF HIGHER EDUCATION
Tuesday, May 30, 2006

Do dormitories, libraries, academic buildings, and student unions really help colleges land – and keep – students? A new study sponsored by the Association of Higher Education Facilities Officers says the answer is a clear-cut yes.

However, the buildings that matter most to students may not be the ones college administrators and others would expect.

"Buildings related to academics are the most important," says David A. Cain, vice president and associate in the higher-education sector of Carter & Burgess, a consulting company. "Students really want to know what type of facilities are in their major."

According to the survey, 73.6 percent of the respondents named facilities related to their majors as "extremely important" or "very important" in choosing a college. Other academic-oriented facilities – the library, technology, and classrooms – followed. Each of those was identified by about half the respondents. Residence halls, which have been an integral part of the recent campus building boom, were a key part of the selection process for 42.2 percent of students.

Students at 46 institutions in the United States and Canada participated in the online survey that produced the data for a report, "The Impact of Facilities on Recruitment and Retention of Students." The survey, conducted in the spring of 2005, drew 16,153 respondents. But data from only the 13,782 students at American colleges were included in a recently released summary of the study.

The report's authors, Mr. Cain and Gary L. Reynolds, facilities director at Colorado College, say their work updates a 1980s study by the Carnegie Foundation for the Advancement of Teaching. That study, considered landmark at the time, found that 62 percent of students surveyed said the factor that most influenced them during a campus visit was the appearance of a college's grounds and buildings.

The new study done by APPA, as the facilities group is commonly known, reinforces the notion that the facilities students see – or do not see – on a campus can mean the difference between whether they enroll or not.

On students' must-see list during college visits were facilities in their major, said 56.8 percent of respondents. Rounding out the top five were residence halls at 53.1 percent, the library at 48.4 percent, classrooms at 46 percent, and technology facilities at 40 percent.

Nearly three out of 10 students spurned a college because it lacked a facility they thought was important. Chief among those facilities were buildings to support the student's major and open space.

Inadequate or poorly maintained facilities, particularly dormitories, were factors almost as important as the absence of a facility. Twenty-six percent of respondents rejected an institution because an important facility was inadequate, and 16.6 percent nixed a college because an important facility was poorly maintained.

The study also revealed how demographic differences, such as race and gender, play a role in how students view campus facilities. For instance, female respondents wanted to see on-campus residential facilities, facilities related to their majors, the library, classrooms, the student union, and open space during a campus visit. However, male students were most interested in seeing an institution's computer and technology capabilities, research and lab facilities, and varsity athletics facilities, Mr. Reynolds says.

The survey's respondents, who ranged from freshmen to graduate students, were 68 percent female and 32 percent male. (A few questions were tested using a gender-balanced subset of the respondents, which gave the researchers "some assurance" that the gender imbalance did not significantly skew the results.) Nearly half of the respondents were enrolled at public institutions with more than 25,000 students.

Over all, 66 percent of students said they were "extremely satisfied" or "very satisfied" with the facilities on their campus.

Mr. Reynolds says senior college officials could find the study useful when deciding how to maximize the impact on enrollment of a limited facilities budget. For instance, "if you're trying to recruit chemistry majors and you have a run-down chemistry building, you might want to put some money into fixing that," he says. Admissions and housing officials could benefit from the study, too, the authors say.

Meanwhile, presidents armed with data from the report can make a case to their trustees, or even their legislators, for "developing policies around what students want," Mr. Cain says. "The students have spoken."

At any rate, colleges that have neglected their facilities can no longer afford to ignore their importance, the report's authors say. "Long-range planning for new construction and the repair and replacement of existing facilities and infrastructure must be a guiding principle within the context of the institution's strategic plans and overall academic mission," wrote Mr. Cain in an e-mail message.

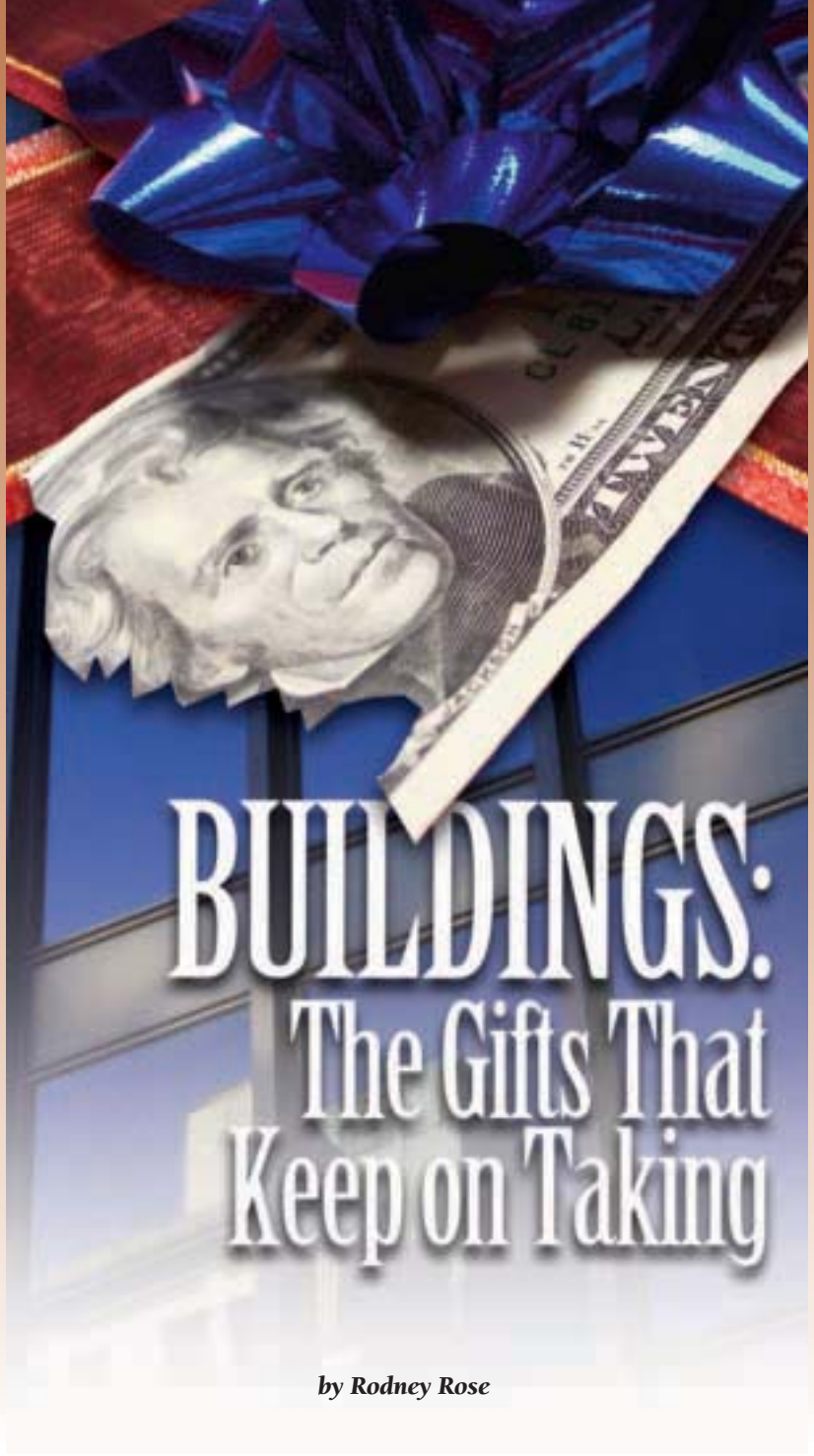
The authors will present their full report in July in Hawaii at APPA's annual meeting, which will be held in conjunction with the National Association of College and University Business Officers and the Society for College and University Planning.

What Facilities Students Look For in Picking a College

A new study by the Association of Higher Education Facilities Officers shows the extent to which students are concerned about campus facilities and their upkeep. Some students, according to a survey, reject colleges if certain facilities are unavailable or if buildings are poorly maintained. Following are facilities that the survey's respondents deemed "extremely important" or "very important" when they were selecting a college:

Facilities for major: 73.6 percent
Library: 53.6 percent
Sophisticated technology: 50.9 percent
Classrooms: 49.8 percent
Residence halls: 42.2 percent
Exercise facilities: 35.6 percent
Bookstore: 34.6 percent
Open space: 34.4 percent
Student recreation facilities: 32.3 percent
Science/engineering facilities: 29.6 percent
Dining halls: 28.6 percent
Performing-arts center: 21.8 percent
Student union: 21.3 percent
Visual-arts center: 15.3 percent
Intramural-sports facilities: 14.8 percent
Varsity-athletics facilities: 14.2 percent

Source: Association of Higher Education Facilities Officers



BUILDINGS: The Gifts That Keep on Taking

by Rodney Rose

A philanthropist agrees to provide $15 million toward the cost of a new $50-million building for a public university's law school. The institution must still raise the balance and cover the costs of ongoing maintenance, operations, and capital renewal—and hope to get some commitment of state funds.

At another university, students vote in favor of increasing fees by $10 per semester to raise the funds needed for a new, state-of-the-art $35-million recreation center. The facility will have two Olympic-sized indoor pools; Jacuzzis; a climbing wall; a fitness center; a running track; basketball and racquetball courts; rooms for video games and meetings; and a small café. However, the students who voted for the increase will not have to pay the additional fees they approved, because they will have graduated long before the facility is to be completed. The additional fees will be added to the tuition of future generations of students. The institution and its student government association will also assume the ongoing responsibility for the costs of operations and maintenance of the recreation center.

These examples represent business as usual for higher education institutions. With some exceptions—such as revenue-generating facilities like residence halls or parking structures that are often built with debt-financing structures that require a reserve for major maintenance over the term of a loan—colleges and universities struggle to provide adequate funds for these costs. Moreover, these expenses can easily exceed three times the cost of initial design and construction of the facility.

Higher education institutions spend about $20 billion annually on facilities operations including the cost required for maintenance, energy, and utilities—and between $15 billion and $18 billion annually for the construction of new facilities and/or the renovation of existing buildings. College and university campuses provide more than five billion square feet of floor space in 240,000 buildings, which have a current replacement value (CRV) that is estimated at more than $700 billion, excluding utilities infrastructure, roads, and landscaping. In addition, there is a backlog in deferred maintenance estimated at more than $36 billion, or 5 percent of CRV. [These numbers are extrapolated from a 1995 APPA/ NACUBO/Sallie Mae study.]

Rod Rose is a strategic consultant with STRATUS—A Heery Company, based in Los Angeles, California. He is also a co-principal investigator and author of* Buildings…The Gifts That Keep on Taking: A Framework for Integrated Decision Making, *recently published by APPA as part of the Center for Facilities Research. He can be reached at rrose@stratus-heery.com.

CFaR | Center for Facilities Research

For most colleges and universities, facilities are not only places that house programs and services. The physical campus is a large part of the fundamental nature of the institution, embedded in the image it presents to faculty, students, and graduates, as well as the local community where the campus is located. Yet, decision makers at all levels of the institution—chief executive officers, Boards of Trustees or Regents, legislators, and facility asset managers—are increasingly concerned about their inability to control both the initial and long-term costs of facilities. These concerns are exacerbated by inadequate funding for maintenance, deterioration of the basic infrastructure of the facilities, and the increasing demands of technology. Much of the problem is driven by an increase in the number of older buildings and the significant costs of capital renewal—the need to replace major components of a facility based on the life cycle of buildings and their subsystems.

These are not new issues. Examples of construction projects that exceed their budgets by millions, or even hundreds of millions, of dollars abound in major public works projects and in a significant number of projects within higher education institutions. The backlog of deferred maintenance continues to increase in spite of decades of books, articles, and unpublished reports from a variety of institutions and government agencies that cite, in substantial detail, the costs and impacts of failing to apply the resources needed to repair and replace buildings and their basic infrastructure. At the same time, new construction continues, driven by increasing demand and growth; new programs and services; advanced technologies; and the need for economic, cultural, and social development. These drivers of construction apply to every aspect of society, in most communities, and in every part of the world.

APPA's new book, *Buildings…The Gifts That Keep on Taking: A Framework for Integrated Decision Making,* is, in large part, a report of the findings of a three-year project sponsored by APPA's Center for Facilities Research (CFaR). The purpose of the research was to examine executive-level decision making regarding facilities. What are the most basic questions that policy makers ask before investing in facilities? What factors influence those decisions? To what extent do these decisions rely on metrics or facilities planning and management models? What can facilities directors and professionals do to help policy makers make better decisions about what and when to build or renovate and how to acquire and spend resources on facilities?

Over the course of the research, performed between 2003 and 2006, the research team conducted interviews and meetings with senior executives of higher education institutions, including institutional business officers, presidents, chancellors, and department heads, and with facilities professionals, including directors, architects, engineers, planners, and private firms that specialize in all aspects of the design, planning, and management of facilities. These representatives exhibited a clear and broad consensus on the most important issues that decision makers must address:

- the need to gain more control of initial and long-term costs
- the need to improve the predictability of desired outcomes
- a rational basis for determining priorities
- cost-effective and more adaptable facilities
- improved use and functionality of space
- improved accountability to the institution's trustees and regents as well as legislators and the public at large
- the importance of attracting support and resources for facilities, including those needed for new construction, renovation, maintenance, and renewal.

The common thread among all of the issues and concerns raised during research for the book is that facilities decisions must be cast in light of their value as an investment. The discussion of facilities is primarily focused on costs, especially initial costs. And the lengthy and complex process of planning, designing, and building facilities—which can take many years for complex projects—results in unforeseen changes and frustration along with the anticipation of finally getting something new built.

Facilities portfolio managers and institutional decision makers require a comprehensive asset investment strategy—a set of integrated decisions that take into account the need and priority for construction and renovation, the total costs of ownership, and the impacts of alternative investment choices on the institution's basic mission and objectives.

However, integrated decision making is not the norm in most institutional and governmental environments. More typically, basic funding for operations and capital budgets is distinct and usually separate, as are decisions regarding organizational responsibility and staffing.

In colleges and universities, many facilities are custom-designed or built to suit specialized uses, which are determined by current users or stakeholders who may or may not have a perspective on long-term future needs—a circumstance that tends to minimize rather than optimize long-term flexibility in the use and function of spaces.

Design and construction costs are considered one-time capital investment costs and typically require funds from sources that are separate from those that fund operating budgets. Maintenance and operations of facilities are usually financed from the same sources of general funds that support ongoing institutional operations—such as faculty salaries, departmental operating expenses, and libraries—and do not include the costs of capital renewal, major repairs, and replacement of systems. Costs related to ongoing space management, facilities planning, or other planning activities are usually considered institutional overhead and unrelated to the costs of maintaining and operating facilities.

The decisions to determine needs, priorities, and the extent of the investment required for facilities and major equipment are not unique to college and university campuses. The same

decision-making criteria are applicable to all organizations responsible for significant facilities portfolios, including federal and state agencies, school districts, and many corporations as well.

For this research, the intent of CFaR was to collect and consolidate what are generally believed to be best practices for facilities planning and management—including common terms, definitions, and metrics—and to translate them into a manageable, readily understood, and easily articulated set of factors to be taken into account when making decisions about investing in facilities. These factors were reviewed and tested with representatives of higher education institutions and government agencies—senior staff, executive and financial officers, members of governing boards, and facilities directors and managers—to determine if they provide an effective and useful decision-making framework for evaluating facilities investment alternatives that can support their institution's mission and help achieve its long-term goals.

However, it is not the intent of this research—or the book—to develop or define a new "universal model" that could be used for the oversight of any institution or facilities portfolio. Rather, APPA hopes that the findings and recommendations offered here will raise the profile or visibility of these methodologies so that more institutions or agencies will seek out these best practices and use them in their respective organizations to improve the decision-making process involved in investing in their facilities.

The Strategic Investment Pyramid

What elements are critical for a clear and effective asset investment strategy for facilities management? A sound strategy takes into account critical factors or decision tools that will help institutional executives and facilities professionals work together in an effort to establish and maintain an organizational, financial, and cultural environment in which integrated decision-making about facilities is the norm and an environment of stewardship is the goal.

To start with, all decision makers should consider some basic strategic questions before initiating any investment in an institution's facilities. The new book provides a list of 50 basic policy questions that are most commonly asked by those involved in the decision-making process related to entire capital programs and specific capital projects. When taken as a whole, the items in the list can be boiled down to only four questions—the questions that are the most critical to address as part of any asset investment strategy:

- Why should we invest?
- What can we afford?
- Where and when should we invest?
- How much should we invest?

Together, these basic questions form the foundation elements of a Strategic Investment Pyramid—a conceptual framework that supports and enhances integrated decision making regarding any investment in facilities. (Illustrated on page 22.) "Integrated" means a process that takes into consideration the operational, programmatic, long- and short-term influences, and impacts of each prospective investment.

Methodology for Determining Strategic Priorities

Experience suggests that priorities for facilities expenditures are either determined by executive judgment or delegated to facilities professionals based on whatever criteria govern the resources they control. For example, strategic facilities investment—like major new construction or renovation or leasing off-campus space—are often driven by subjective criteria, such as a new funding opportunity or gift, a department's need to accommodate new teaching or research programs, or unmet needs that have reached a state of urgency. Sorting out these priorities usually involves high-level discussions among deans, department heads, provosts, business officers, and presidents.

On the other hand, an institution's administrators usually leave it to facilities professionals to deal with the usually long list of improvements that need to be made to facilities—replacing electrical, mechanical, or plumbing systems; improving the landscape in front of a building; or installing a new air conditioning system, for example—and to set priorities based on management oversight and inspection activities that are part of facilities managers' responsibilities. In both cases, administrators are faced with an annual wish list that is put in some kind of priority order and is always much longer than the available resources can accommodate.

Yet, some universities and federal agencies have developed relatively simple—but more objective—decision tools for determining priorities for facilities. These tools are not used to replace the judgment of agency or institutional leaders but to complement it. Each of these methods directly aligns facility priorities with the institution's mission or programmatic criticality. The uses of indexes such as the U.S. Coast Guard's Mission Dependency Index (MDI), the U.S. Department of the Interior's Asset Priority Index (API), and Brigham Young University's systems-based priority approach are detailed in chapter 4 of the new book.

Objective priority-setting methods used in concert with the judgment of executives who have a wide perspective on institutional goals and objectives will result in better decisions about the priority of investments in facilities.

Integrated Decision Making

The top of the Strategic Investment Pyramid represents the coming together of all the critical layers of information into an integrated investment strategy. Such a strategy might involve multiple scenarios or plans, such as plans for ongoing maintenance and operations, capital renewal, new construction, or reallocation and reutilization of existing space. Of course,

Facilities portfolio managers and institutional decision makers require a comprehensive asset investment strategy—a set of integrated decisions that take into account the need and priority for construction and renovation, the total costs of ownership, and the impacts of alternative investment choices on the institution's basic mission and objectives.

these plans must be reviewed periodically and aligned with the strategic or business plan for the entire institution. Nevertheless, the strategy should always focus on the expected return on the investment in facilities and should be stated in terms of measurable business or institutional outcomes. It is the expected achievement of those outcomes that will enhance the attraction of resources and support for both programs and facilities.

Effective use of the Strategic Investment Pyramid has a number of significant benefits. It focuses on the investment value of facilities and promotes integrated planning and budgeting, providing an excellent tool for making the business case for alternative solutions to facility needs—including the alternative to decide that no project will be undertaken. Using the pyramid approach allows the data and analytical requirements to be easily collected and readily organized into typical accounting and financial structures and also promotes the application of reasonable standards and benchmarks across multiple institutions, within a given institution, and for specific buildings, including infrastructure elements.

Recommendations for an Asset Investment Strategy

The research conducted by CFaR identified a number of key recommendations or initiatives that institutional leaders and organizations can implement to support the development of an asset investment strategy and to maintain a culture of stewardship:

1. Institutions should establish a reserve account for maintenance and capital renewal as part of the initial agreement to build and/or finance a facility.
2. Cost-effective approaches that are more common in the private sector should be encouraged within both higher education and government agency environments. In addition, standards should be developed to reduce the need for customized design and frequent remodeling of spaces. These measures can help mitigate the impact of changes in program focus and technology developments over time.
3. New construction should be evaluated in light of existing capital renewal needs, requirements for ongoing maintenance and operations, and alternatives for reallocation or renovation of space.
4. Facility condition assessments should include a methodology for determining priorities for buildings and systems that can be related to program or mission goals.
5. To enhance and support decision processes related to facilities, wherever possible, institutions should explore and use the excellent facilities models that private firms and consultants, government agencies, and many higher education institutions have developed to predict and manage capital renewal and deferred

Obviously, most institutions find it difficult to turn down a generous offer to fund a new building. Donors nearly always want to maximize the amount of space built, expecting the recipient college or university to find the means to operate and maintain the programs that will occupy the building and to finance its maintenance and capital renewal requirements.

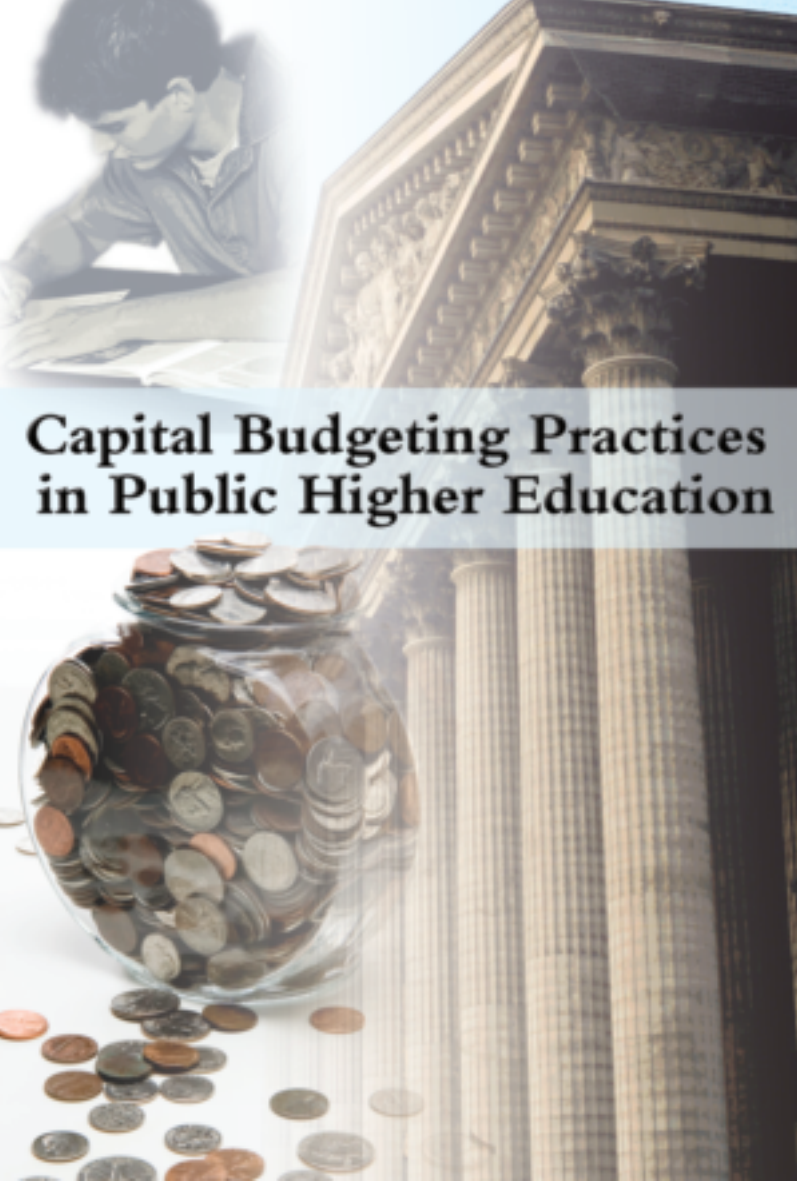
maintenance needs. Most of these models are as adaptable to small private colleges as they are to large public universities.

6. Facilities planning, management, and/or investment strategies should always be linked to the institution's mission and goals. These links should be articulated clearly in an institutional strategic plan.

Obviously, most institutions find it difficult to turn down a generous offer to fund a new building. Donors nearly always want to maximize the amount of space built, expecting the recipient college or university to find the means to operate and maintain the programs that will occupy the building and to finance its maintenance and capital renewal requirements. But because those costs *far exceed* initial design and construction costs, it is imperative to hold frank discussions about the implications of the *total cost of ownership* before initiating a major capital investment.

This situation poses a challenge not only for higher education institutions but also for cities, school districts, religious and nonprofit organizations, and even some government agencies, which are frequently faced with the same dilemma: the desire to take advantage of a gift, a public bond referendum, or a new federal program that would provide a facility that could not otherwise be built. But the big "catch" is the need to commit to the long-term operating costs, which are, more often than not, the most difficult costs to provide and the costs that endure over time.

The establishment of an asset investment strategy for a facilities portfolio will provide a significant benefit to decision makers, particularly if that strategy is reviewed and updated regularly. Such a strategy can create a firm foundation for those whose job it is to plan and maintain facilities as well as for the consultants, architects, engineers, and contractors in the industry who design and construct the buildings. And—perhaps most importantly—an asset investment strategy will lay a solid basis for decision making for those boards, legislatures, trustees, and others who must be convinced to locate and maintain the resources that are needed to support the facilities portfolio over time.



Capital Budgeting Practices in Public Higher Education

by Derrick A. Manns and Stephen G. Katsinas

This study finds that most states do not have a coordinated master plan for facilities to prioritize their needs given the limited resources that exist to address the economic and educational goals for public higher education. This is needed to address the potential numbers of new students, lifelong learning opportunities, and workforce development issues. Statewide priorities are needed to address the deferred maintenance challenge, especially in light of growing needs for upgraded laboratories, research equipment, and appropriate academic space.

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If America is to provide sufficient access to higher education programs, a good infrastructure is essential, as the late Ernest L. Boyer of the Carnegie Foundation for the Advancement of Teaching recognized (Boyer 1981). Sadly, the sound practices that facilities experts have long suggested—comprehensive, periodic facilities audits, the creation of baseline data for institution and state master plans for facilities--is not occurring, despite the obvious need for such data to improve planning processes for chief executive officers, trustees, coordinating boards, legislators, and governors (Manns, 2001). Experts have also suggested that between 1.5% and 3% of the institution's operating budget should be devoted to facilities repair and renewal (Bareither, 1977; Kaiser, 1996). The conceptual approach of periodic, comprehensive audits starting at the institutional level and working up to the statewide master plan, may be termed the "rational" approach to facilities assessment, renewal, and funding. The budgetary and political processes that fund capital needs in public higher education are not always rational, however.

In 1989, APPA released a national assessment of the facilities challenge facing American colleges and universities. *The Decaying American Campus: A Ticking Time Bomb* (Rush and Johnson 1989) painted a daunting picture: The total replacement value of all U.S. higher education facilities was estimated at $300 billion, and 20 percent of these facilities required replacement costing $60 billion. One third of these replacement needs were classified as urgent (p. viii). A 1995 follow-up study estimated those urgent needs to have grown to $26 billion (Kaiser, 1996). Given the severity of the current recession's impact on public higher education resources, a conservative estimate is that deferred maintenance might rise by more than 25 percent (Williams June, 2003).

In 1998-99, one of this paper's coauthors, Derrick A. Manns, initiated a state level study to assess the facilities challenge. Manns (2001) study titled "A Fifty State Assessment of Capital Needs for Public Higher Education," was designed to complement the annual Grapevine survey of public higher education operating budgets initiated in 1958 by Illinois State University. The sources of Grapevine's data are the chief fiscal officers of state higher education agencies (SHEFOs). Founded by the late M.M. Chambers, and continued by Edward Hines and currently James C. Palmer. Grapevine is oldest independently collected, continuous longitudinal data set on public higher education in the United States (Palmer and Hines 2000). Its continuing popularity has much to do with its operational methodology that has as its base comparing state need to the relative ability and capacity of that state to invest in higher education. No effort has been made to gather information on private investments, grants, gifts, or bequests made to public colleges and universities. Although some capital funding may come from tuition and other sources, this study did not gather that information.

Methodology of the Present Study

The purpose of this study was to assess state budgeting practices for public higher education capital needs for the years 2000-2004. In Manns' 1998-99 study, A Fifty State Assessment of Capital Needs for Public Higher Education, SHEFOs were asked to report using the last available complete year, 1996-97. Since no major national study of its type had been attempted for several years, the 1998-99 study attempted to ascertain state policies, practices, and problems related to capital funding for public higher education. That study had an excellent response rate of 82%, or 41 states. In the fall of 2003, that study was updated, with some changes in the questions. Again an excellent response was obtained from 40 states (See Appendix A). The updated study also gathered data from the intervening years of 2000 to 2004, so as to provide a more complete picture of changes over time. As with the 1998-99 administration, the data collected on state tax appropriations for capital budgets were collected in a manner designed to complement the existing Grapevine database (Palmer and Hines 2000).

This study was limited to public higher education in the 50 states. Data were requested for all fiscal years from 2000 to 2004, to provide a more complete picture of changes over time, but many could not or did not provide 2004 data. The state higher education finance officers (SHEFOs) were designated as the officials most likely to respond as each state must have a designated person or staff responsible for collecting higher education information according to the Higher Education Facilities Act of 1963, as amended. When no SHEFO could be identified, the survey was sent to the chief executive officer.

A methodological approach modeled after the Grapevine studies was chosen for the following reasons: first, to allow for nationwide comparisons of the operating and capital budgets; second, to lay the foundation for a longitudinal database of state appropriations for capital needs that builds on the strengths of the Grapevine methodology, most notably the ability to compare funding effort and overall state capacity. The authors were also interested in the investments in capital needs of "fast growth" states—with double digit increases in high school graduates—since serving Tidal Wave II students is a major challenge faced in many states. It is important to note that this study collects only capital needs data provided by state or public funds. The two research questions addressed in this study are: 1) what decision-making, funding, and allocation processes are used to meet capital needs for public higher education across the U.S., and 2) to what degree are sound practices as described by experts in the field facilities management actually occurring in the states?

Results

Questions to obtain basic information about the decision-making processes for meeting capital needs for public higher education at the state level were initially asked. The majority of respondents indicated that:

- Their states do not mandate that their public institutions of higher education set aside general operating funds from the annual operating budget appropriations for renewal and replacement (90%);
- A majority of the states do not have a statewide facilities master plan (65%);
- Overwhelmingly, funding formulas are not used in the request phase by state higher education agencies to request funds for public higher education capital needs. Funding formulas are more likely to be used in the budget request phase for *operating* needs than for *capital* needs in a large majority of states (75%); and
- States lack comparative data.

The majority of states use some common mechanisms for deciding, funding, and allocating for capital needs in public higher education. No two states are alike, however, and legislatures generally allocate capital funds directly to higher education institutions without the use of formulas to allocate

these funds. When respondents were asked about the process used to allocate capital appropriations at the state level, the majority indicated that all or most of capital funds were given directly to the campuses from the state legislatures.

While legislatures in most states are willing to statutorily assign responsibility for preparing a unified operating budget request to state higher education agencies, they appear unwilling to relinquish a proprietary role over the budgetary request and allocation of public higher education capital funding. It may also reflect a desire on the part of state legislators to not delegate to the state higher education agency (and governors) political credit associated with investments in capital budgets.

Decision-Making Process. Of the 40 responding states to the question "Does your state mandate that its public institutions of higher education set aside general operating funds from the annual appropriation for renewal and replacement?", four states or 10% indicated that they did, but 36 states or 90%, did not.

Operating Funds Set Aside for Public Higher Education Capital Needs. The literature on facilities has long suggested that setting aside a dedicated percentage of operating funds for capital needs to be good management practice. In Kaiser (1982) suggested that institutions should set aside between 1.5% and 3% of their operating budgets for facilities renewal and replacement. When asked the question " What percent of operating funds are set aside for renewal and replacement in your state?" 25 of the 40 states (63%) responded. Of these 24, 20 states or 80%, set aside between 0 and 1.5% of their operating budgets at the state level for facilities, and 17 of these 20 set aside less than 1.0%, below what the literature suggests. Five states (21%) [MN, IL, MO, ND, VA] set aside 2.0% or more of their operating budgets for renewal and replacement of facilities. One state (VA) indicated that setting aside more than 5.1% of their operating budgets for facilities renewal and replacement.

Process Used for Capital Funding Allocations. There are many differences across the states with regards to appropriating funds for higher education facilities. Some legislatures appropriate all funds directly to the higher education agency (HEA), while others do so to individual campuses. If funds are given to the HEA, then to what extent are the funds allocated to the campuses? States were asked to respond to the question, "What best describes the allocation process in your state?" Thirteen states (33%) indicated that all or most of the funds allocated for capital needs at the publicly controlled institutions in their states were given to them by the designated state agency. Twenty-seven (68%) indicated that *all* or *most* funds for capital needs at the campus level were given to the institutions by the legislature.

Long-Range Facilities Planning and Facilities Audits. Facilities experts also advocate the need for long-range facilities master planning (Kaiser 1996). Instinctively, it seems logical that statewide facilities master plans would be good

TABLE 1 CAPITAL APPROPRIATIONS 2000-03

State	2000 Capital Appropriations	2001 Capital Appropriations	2002 Capital Appropriations	2003 Capital Appropriations
AL		26,284,404		
AK	3,450,000	69,424,100	2,965,500	29,665,500
AZ		0		0
AR	28,607,500	28,607,500	10,589,906	10,589,906
CA				
CO	123,908,000	61,000,000	6,722,806	519,779
CT	290,810,473	270,708,960	257,787,827	190,358,100
DE	30,500,000	29,000,000	20,000,000	13,000,000
FL				
GA	149,309,208	204,260,000	139,290,000	92,025,000
HI		219,515,000	84,044,000	22,804,000
ID				
IL	302,288,400	205,159,700	369,372,900	282,397,600
IN	169,609,029	175,329,908	153,266,181	178,266,181
IA	19,500,000	25,115,000	28,243,000	54,197,300
KS				0
KY				
LA				
ME				
MD	152,569,000	290,314,000	217,485,000	294,969,000
MA				
MI	175,100,000	235,400,000	138,900,000	41,600,000
MN	131,100,000		158,800,000	
MS				63,760,000
MO	92,843,020	140,042,937	0	0
MT				
NE	27,347,870	18,010,547	16,338,222	12,638,681
NV	62,307,996	62,307,996	64,137,442	64,137,442
NH				
NJ	0	0	0	0
NM				
NY				
NC	0	2,500,000,000	0	0
ND	8,155,000	8,155,000	7,660,000	7,660,000
OH	252,755,028	248,110,441	248,110,441	249,485,234
OK				
OR				
PA	40,000,000	65,000,000		65,000,000
RI	5,456,000	6,500,000	5,646,922	7,486,654
SC	89,000,000	0	0	0
SD		11,034,832		16,648,664
TN	83,000,000	15,400,000	49,500,000	18,000,000
TX				
UT	60,413,700	10,880,800	90,050,400	113,721,500
VT	3,000,000	1,000,000	3,000,000	1,000,000
VA	133,002,000	26,811,000	26,811,000	429,000,000
WA				
WV	33,570,000	35,337,000	37,197,000	39,155,000
WI				
WY	0	0	125,000	12,740,000

policy at the state level as well. When asked, "Does your state have a long-range facilities master plan for public higher education?," 14 states (35%) indicated a facilities master plan existed, while 26 (65%) did not. When asked "How often does your state conduct facilities audits?," 4 states indicated conducting facilities audits yearly, 5 states indicated conducting facilities audits every 2-3 years, and the vast majority, 30 states or 77%, indicated that they did not conduct facilities audits on a regular basis.

The study revealed that roughly two-thirds of all states possessed no long-range master plan for facilities, and just 9 states conducted regular periodic facilities audits. *The vast majority do not conduct facilities audits on a regular basis or at all.* These findings—that master planning and facilities audits were not widely conducted, is probably not surprising given the limited role most designated state agencies have related to appropriating funds for facilities. Still, this finding is troubling, because the size of the problem as documented in the APPA, NACUBO, and other studies indicate that a comprehensive statewide approach will be needed to address the facilities challenge.

State Appropriations for Operating and Capital Budgets. Table 1 presents the responses from states regarding appropriations for capital budgets for fiscal years 2000-2003. Data for capital budgets were obtained directly from the survey respondents using the question, "What was your state's funding amount for capital appropriations for public higher education? If funding in your state is provided biennially, take the biennial amount for the period and divide by two." Table 1 clearly shows a wide disparity exists among and between the states, in terms of capital appropriations for public higher education.

Not surprisingly, the amount of state appropriations for capital needs is far less than for operating needs. This is not to suggest that these numbers should be the same, or even close to the same, since there are inherent differences in the uses of operating and capital funds. Still, funds must be available for capital needs if instruction, advising, research and other common functions in higher education are to take place.

Deferred Maintenance of Facilities. States were asked to respond to the question, "Does your state higher education governing or coordinating board have an estimate of the amount of deferred maintenance currently existing for public institutions?" Of the 39 responding states to this question, 30 (77%) indicated they possessed an estimate of the amount of deferred maintenance, while 9 (23%) did not. Table 2 shows the most recent data available listing the amount of deferred maintenance and the replacement values for states that reported this data.

Facilities Condition Index. Harvey H. Kaiser in his 1996 APPA study discussed the "Facilities Condition Index" (FCI), which compares the estimated replacement value of facilities to the estimated deferred maintenance. Table 3 represents the Facilities Condition Index for this current study. Kaiser sug-

TABLE 2

Estimated amount of Deferred Maintenance And the Current Replacement Value (FY 2003)

State	2003 Replacement Value	2003 Deferred Maintenance
Alabama		1,090,717,378
Alaska	*	150,000,000
Arizona	4,500,000,000	216,000,000
Arkansas	3,000,000,000	1,300,000,000
California		
Colorado	7,200,000,000	388,757,000
Connecticut	2,700,000,000	
Delaware		
Florida		
Georgia	5,900,000,000	
Hawaii	1,600,000,000	180,000,000
Idaho		
Illinois	15,000,000,000	1,600,000,000
Indiana	9,600,000,000	
Iowa	5,900,000,000	145,700,000
Kansas	4,049,134,000	682,700,000
Kentucky		294,381,000
Louisiana		
Maine	5,968,587,157	
Maryland		73,000,000
Massachusetts		
Michigan	3,100,000,000	
Minnesota		625,000,000
Mississippi	4,793,535,685	
Missouri		
Montana	3,011,500,000	
Nebraska	2,080,000,000	
Nevada		59,000,000
New Hampshire	3,600,000,000	
New Jersey		200,000,000
New Mexico		
New York		
North Carolina	1,089,400,000	605,000,000
North Dakota	15,300,000,000	72,000,000
Ohio		2,300,000,000
Oklahoma		1,783,658,443
Oregon	4,000,000,000	
Pennsylvania		700,000,000
Rhode Island	2,500,000,000	48,500,000
South Carolina	800,829,483	603,000,000
South Dakota	3,705,420,500	26,588,374
Tennessee	14,385,866,350	1,000,000,000
Texas	3,300,000,000	523,308,780
Utah		300,000,000
Vermont	4,722,869,000	
Virginia		602,000,000
Washington	1,125,000,000	
West Virginia	6,000,000,000	95,000,000
Wisconsin		645,000,000
Wyoming		53,000,000

**Dollar value was reported but is inconsistent with previously reported data.*

TABLE

State	2003 Replacement Value	2003 Deferred Maintenance	FCI
Alabama		1,090,717,378	
Alaska	*	150,000,000	
Arizona	4,500,000,000	216,000,000	4.8
Arkansas	3,000,000,000	1,300,000,000	43.3
California			
Colorado	7,200,000,000	388,757,000	5.39
Connecticut	2,700,000,000		
Delaware			
Florida			
Georgia	5,900,000,000		
Hawaii	1,600,000,000	180,000,000	11.25
Idaho			
Illinois	15,000,000,000	1,600,000,000	10.66
Indiana	9,600,000,000		
Iowa	5,900,000,000	145,700,000	2.46
Kansas	4,049,134,000	682,700,000	16.86
Kentucky		294,381,000	
Louisiana			
Maine			
Maryland	5,968,587,157	73,000,000	1.22
Massachusetts			
Michigan			
Minnesota	3,100,000,000	625,000,000	20.16
Mississippi			
Missouri	4,793,535,685		
Montana			
Nebraska	3,011,500,000		
Nevada	2,080,000,000	59,000,000	2.83
New Hampshire			
New Jersey	3,600,000,000	200,000,000	5.55
New Mexico			
New York			
North Carolina		605,000,000	
North Dakota	1,089,400,000	72,000,000	6.6
Ohio	15,300,000,000	2,300,000,000	15.03
Oklahoma		1,783,658,443	
Oregon			
Pennsylvania	4,000,000,000	700,000,000	17.5
Rhode Island		48,500,000	
South Carolina	2,500,000,000	603,000,000	24.12
South Dakota	800,829,483	26,588,374	3.32
Tennessee	3,705,420,500	1,000,000,000	26.98
Texas	14,385,866,350	523,308,780	3.63
Utah	3,300,000,000	300,000,000	9.09
Vermont			
Virginia	4,722,869,000	602,000,000	12.74
Washington			
West Virginia	1,125,000,000	95,000,000	8.44
Wisconsin	6,000,000,000	645,000,000	
Wyoming		53,000,000	

**Dollar value was reported but is inconsistent with previously reported data.*
Note: Only 22 states provided enough data to calculate the FCI.

gested that "the FCI should be held below 5.0% and, under certain conditions, closer to 2.0%" (Kaiser, 1996, p. 43).

In other words, the FCI represents the depleted value of a given states' physical plant. Once established as a reliable number, it can be used regularly for planning and budgeting purposes as a tool to address and improve unsatisfactory conditions. Kaiser, and other facilities studies found in the literature, suggests detailed facilities audits as the best method by which to determine that desired target, and to evaluate opportunities to accomplish remedial work in a cost-effective manner. It is very important, Kaiser argues, for facilities audits to be completed and updated regularly so that reliable results can be obtained from year-to-year (Kaiser, 1996). This data can only be used if the data collected are accurate and consistent.

Discussion

It is clear that an overwhelming majority of states do not set aside operating funds for renewal and replacement of public higher education facilities, as suggested by facilities experts. It is undeniable that the current economic situation in the states, and the limited recovery to date, will only add additional billions to the growing backlog in public higher education infrastructure investment, to say nothing of the additional investment needed to meet the facilities needs of "Tidal Wave II."

The vast majority of states do not deploy practices recommended by facilities management experts, including the allocation of a small percentage of operating funds for deferred maintenance. Similarly, a majority of states do not set aside the minimum of 3 percent of their operating budgets for renewal and replacement of facilities in public higher education. States could make use of successful models in other states and at other public institutions. It should be noted that some states have been quite creative in addressing these needs through dedicated funds, special line items, or other programs.

Recommendations

To address some of these concerns and issues, this study offers the following recommendations.

Comprehensive master plans for facilities. The first and most logical step is to collect useful, consistent data for master planning at both the institution and statewide levels. Statewide facilities master plans for public higher education built from the "bottom up" are needed. This requires consistently collected data across all institutions and sectors of public higher education. While some states require their local community college boards to fund facilities renewal, replacement, and new construction, community colleges should not be excluded from any statewide facilities master planning process.

STATES RESPONDING TO THE SURVEY, 1998-1999 AND 2003-2004 ADMINISTRATIONS

	1998-1999 SURVEY			2003-2004 SURVEY				
Region	**Responding States**	**Non-Responding States**	**Total**	**Region**	**Responding States**	**Non-Responding States**	**Total**	**States that Responded in 1999 & 2004**
Northeast	CT, IL, IN, ME, MA, NH, NJ, OH, PA, RI, VT, WI	MI, NY,	12 of 14 86%	**Northeast**	CT, IL, IN, MI, NJ, OH, PA, RI, VT, WI	NY, ME, MA, NH	10 of 14 71%	CT, IL, IN, NJ OH, PA, RI, VT WI *(9 of 14, 64%)*
Southeast	AL, DE, GA, KY, MD, NC, SC, TN, WV	FL, MS, VA	9 of 12 75%	**Southeast**	AL, DE, GA, KY, MD MS, NC, SC, TN, VA, WV	FL	11 of 12 92%	AL, DE, GA, KY, MD, NC, SC, TN, WV *(9 of 12, 75%)*
Northwest	AK, IA, ID, MN, NE, ND, SD, WY	MT, OR, WA	8 of 11 73%	**Northwest**	AK, IA, ID, MN, NE, ND, SD, WY	MT, OR, WA	8 of 11 73%	AK, IA, ID, MN NE, ND, SD, WY *(8 of 11, 73%)*
Southwest	AR, AZ, CA, CO, HI, KS, LA, NM, NV, OK, TX, UT	MO	12 of 13 92%	**Southwest**	AR, AZ, CA, CO, HI KS, MO, NV, OK, TX, UT	LA, NM, OK	11 of 13 85%	AR, AZ, CA, CO HI, KS, NV, OK TX, UT *(10 of 13, 69%)*
Total:			**41 of 50 82%**	**Total:**			**40 of 50 80%**	

Notes: 1. Regions were determined using GRAPEVINE methodology, some percentages were rounded.
2. Some states have more than one state agency responsible for some level of higher education, so it is possible to have multiple state responses. For example Wyoming submitted a state response for both 4-year and 2-year schools.
3. 1998 –1999 survey was doctoral dissertation by Derrick Manns. 2003-2004 survey was an update.

Increased cooperation. State legislatures should use their latent convening power and near unlimited investigatory power to study and bring attention to this issue. Professional organizations within higher education, and civic organizations external to the academy, should be encouraged to participate. It is clear that legislative leadership is essential. Sadly, the 2004 meeting of the National Conference of State Legislatures did not include a single session devoted to the issue of funding public higher education facilities.

Develop a longitudinal database. No longitudinal database on facilities funding for public higher education currently exists. This study attempted to provide a multi-year snapshot of state tax appropriations for public higher education facilities. A longer term view is clearly warranted. The U.S. Department of Education, the Education Commission of the States, and the State Higher Education Executive Officers (SHEEO) all have a vested interest to ensure that a longitudinal data set is developed.

Strengthen role of higher education agencies. The role of state higher education agencies in collecting good facilities information should be strengthened. State HEAs should routinely collect facilities data that is directly tied to their long-term state policy enrollment and success objectives for public higher education.

Conclusion

New public higher education facilities that are constructed or upgraded today will likely be around in 2040, decades after any bond issue is retired. Policy-makers should consider creating dedicated, permanent revenue streams to fund the construction, renovation, and rehabilitation of the physical infrastructure of public higher education. Currently, it appears that only an extremely limited amount of funding can be allocated on an annual basis, which tends to emphasize the improvement of existing space (patching), and deployment of limited resources now available to match available federal and private funds (attracting). Sadly, the long "to-do" list of things to be repaired seems only to get longer (Williams, June 2003). As Gratto et.al. note, colleges and universities must "maintain environments, places, and spaces that demonstrate concern for safety, comfort, and enjoyment of people" (2002, p. 24).

As institutions grow to meet a dramatic increase in the size of the college-eligible student pool during the first decade of the 21st century, so too will the demand for physical facilities. Over the next several decades, the higher education enterprise will continue to require the construction, renewal, and replacement of its facilities. Without adequate facilities, the academic enterprise will have difficulty meeting its fundamental societal purposes to develop talent and promote the cause of equity (Astin 1985). Furthermore, developments in science and technology will require new investments in the research facilities on many college campuses.

Facilities will continue to be the backbone of American higher education and without adequate buildings; research, teaching, and service could be impaired. The capital needs of public higher education must be formally and consistently addressed if the states are to effectively utilize all their human resources to meet the educational and social needs of the 21st century (Amaratunga and Baldry 2000).

Facilities will continue to be the backbone of American higher education, and without adequate buildings, research, teaching, and service could be impaired.

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