State of Facilities in Higher Education
2014 Benchmarks, Best Practices & Trends
Introduction

Throughout its history, higher education has evolved to meet operational challenges and the changing needs of our society. Today, after a period of campus growth, changing demographics and financial realities present new challenges. Most sector analysts agree that the next 10 to 15 years will bring significant shifts to the delivery of education and learning environments at colleges and universities across the country.

Facilities leaders are on the frontlines of this change. Since the recession, departments have consistently been called upon to do more with less. However, as the “fixed” costs of physical plant operations continue to rise, balancing the budget has meant reducing service levels and cutting back on efforts to reduce the backlog. Seldom discussed are ways to address the fundamental root causes of the increase in facilities expenditures. Sightlines believes there needs to be a new dialogue around facilities on our campuses. Reversing these trends will not be accomplished through budget cuts. Real change will only take hold when policies regarding space management and capital allocation are used to drive a new service and cost structure across the institution.

Over the last decade, Sightlines has been publishing the state of facilities in higher education report. In a review of 2013 we were beginning to see the early signals of several broad challenges:

- Declining numbers of high school graduates are beginning to affect enrollments and changing campus density, but the effects are variable across sectors.
- Resources on most campuses remain constrained as net tuition revenue growth is limited by financial aid pressures, and outside support, from both public and private sources, is at best steady.
- Capital and operating investments for campus facilities have fallen and remain below FY 2009 levels, in terms of real dollars.
- Capital needs for facilities continue to grow as campus spaces built in the 1950s-1960s have passed key age thresholds and need to be renewed. In addition, the more complex campus buildings constructed since 1995 require attention to keep them operating efficiently.

These high-level trends are not much different today than they were last year. To the contrary, they are more real than ever. Finance and facilities leaders recognize that capital and operating budgets are not likely to

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"One side effect of this rapid growth has been the creation of an increasingly large obligation for the future renewal and replacement of the physical plant."

Rick Biedenwig - 1980
Founder, Pacific Partners Consulting Group
return to pre-recession levels for some time. State appropriations, debt, and enrollment increases are not viable options to closing the systemic gap between needs and funding.

They say “necessity is the mother of invention.” However, for facilities professionals, necessity is the mother of innovation. Across the country Sightlines is engaged in new conversations with the purpose of identifying creative ways institutions can transform their physical environments while simultaneously reducing the percentage of institutional budgets dedicated to facilities. These discussions do not simply revolve around reducing budgets. They focus on identifying the primary drivers of facility investment and advocating for institutional policies that optimize resources and produce desired outcomes for facilities.

Colleges and universities will need to make courageous decisions regarding physical assets. The response to today’s challenges must be more than further budget cuts. To make real change, leadership must rely on clearly defined policies around space management and capital allocation. New construction cannot outpace growth or initiatives to preserve existing assets. Space policies must evolve to release hidden value in our buildings and balance sheets. Similarly, capital allocation strategies must focus on supporting mission and mitigating long-term risk. The combination of these two initiatives will result in lower operating costs and more effective facility management functions for the campus.

Sightlines has documented how these concepts are taking hold across several prominent institutions nationwide. These institutions are increasing the utilization of campus facilities while reexamining how finite capital dollars are used to unite the needs of repairs, modernization and mission.
Listed below are a few of the concepts that have gained popularity recently:

- No net new square footage policies are driving campuses to remove dysfunctional buildings in poor repair, replacing them with more efficient facilities.
- Utilization rates, measured by campus density, are growing particularly in research institutions.
- Campuses, both public and private, are investing more in the annual capital upkeep of their facilities (stewardship) to shift the focus away from short-term corrective actions and towards slowing the growth of deferred maintenance.
- Campus land use and building scale are under review. The historic model of acquiring land and small buildings is being challenged and we have seen campuses consolidate functions housed in many small buildings into a larger more efficient facility.
- Monetizing campus non-core facility assets is on the table. Campuses are looking seriously at public/private partnerships (P3) to monetize non-core facilities, such as housing, parking, and retail.

Sightlines looks forward to playing an important role in changing the conversation as campuses work to find creative solutions to adapt to today's challenges. In the 2014 State of Facilities in Higher Education report, we discuss prevalent trends across hundreds of institutions as well showcase institutions that have made real change.

THE SIGHTLINES DATABASE
The 2014 State of Facilities in Higher Education draws from the largest verified database of college/university facilities metrics in the country.

- Database features over 450 institutions in 43 states with over 1 billion gross square feet of space.
- All data is collected and verified by Sightlines professionals.
- Database supplemented by our 2014 analysis of 51 Canadian universities with 200 million gross square feet of space.
Space and Density

The History
Throughout the last half century, colleges and universities have responded to periodic increases in demand through the construction of new space — a permanent solution. The post-war era driven by the G.I. Bill and government supported research led to the biggest growth in campuses on record. Similarly, children of the baby boom generation fueled high graduation rates and led to record enrollments throughout the 1990s and early 2000s. This uneven acceleration in higher education demand has led to two distinct groups of institutional buildings with competing needs.

The Post-War building boom. Sightlines database identifies 1950-1975 as an era when 40% of current university space was constructed. The amount of space and speed of construction during this era resulted in lower construction quality. Additionally, experimental construction techniques lead to troubled mechanical and HVAC systems within these buildings. Not only are these spaces due for major repair and renovation, many of these spaces, even if renovated, will not meet today’s programmatic needs.

Millennial expansion. While the 1960s buildings are demanding investments, so are the spaces built since 1995. Sightlines database identifies this period as the second largest construction era with 27% of all space nationally built since then. In general, these buildings represent a strong construction quality and tend to be LEED certified with complex mechanical systems. This space therefore has shorter equipment lifecycles which will require more frequent maintenance. These capital needs will inevitably compete with the 1960s buildings’ needs.
Managing Density

Demographic projections indicate that the enrollment of traditional high school graduates will no longer be able to support campus expansion at rates seen in years past. Collectively, the single biggest way institutions are controlling facilities overhead is by managing the pace of growth. Colleges and universities of all types are reaching out to new populations of students, while also slowing the rate of new construction and increasing space utilization rates across campus.

At Sightlines member campuses, enrollment has grown by 9% between 2007 and 2011. During this same period, space grew by roughly half that amount. This suggests that campuses responded to the growth in campus population, but in a measured manner. Since 2011 enrollment nationally has only increased 1% and space growth has followed the same trend. Historically, we know that there is often a lag in campus response to enrollment, and that some of the space being constructed after 2011, when enrollments are leveling, was approved a few years earlier at the height of the enrollment growth and is just now coming online. This would suggest that density numbers could continue to rise in recognition of slowing enrollment.

When we disaggregate the data by type of institution, we see a different picture. One of the most interesting trends is that research institutions have been growing their density (students and faculty per 100,000 square feet) at over double the rate of others. Comprehensive institutions are increasing
density, but the small institutions are not. Our data also shows that research institutions are not seeing a leveling off of enrollment growth. Although we do not have empirical data on the cause, we suspect this may be due to a number of issues, including the attractiveness of their programs, the introduction of honors programs within the university to attract high GPA students, the reputation of the flagship institution within their state, and, of course, lower out-of-pocket costs for students.

**CONSTITUENT GROUPS DEFINED***

**Small Institutions**: Four year public and independent institutions with full-time enrollment under 4,000; specialized institutions (art, engineering, technology, etc.); also includes two-year independent colleges and independent secondary schools.

**Comprehensive/Doctoral Institutions**: Four-year public and independent institutions with enrollment above 4,000; Carnegie categories — Baccalaureate, Masters or Doctoral.

**Research Universities**: Public or independent research universities and medical schools/centers. Carnegie categories — Research Universities High (RU/H) and Research Universities Very High (RU/VH).

* Sightlines uses NACUBO's definitions of constituent groups.
Comprehensive institutions have the highest rate of space growth, but it is still less than their growth in enrollment. These institutions are holding their own with enrollment nationwide, although we have documented enrollment declines among comprehensive institutions in states like Pennsylvania, Connecticut and Maine.

Small institutions are actually seeing a decline in student enrollment starting in 2011, however they continue to add space despite this drop. Many of these largely private and residential campuses are constructing new student life and housing space to remain competitive with peers and lower cost public institutions.

“Changing the Age” of Campus Facilities

The distribution of space across age categories is an important indicator of long-term facilities risk and capital needs. When too much space is concentrated in a specific age category, such as between 25-50 years old, campuses are challenged to find the money to address the preponderance of needs coming due simultaneously. With a concentration of buildings constructed in two distinct periods, this is often the rule rather than the exception. The result is that campuses are forced to make tough choices. Further complicating this challenge, the recent economic downturn forced campuses to postpone renovations and defer needed maintenance to a later date.

Sightlines compared the construction age of buildings across U.S. campuses to their renovation age. This is a measure of whether there has been a significant amount of renovation (which we define as capital investment amounting to more than 50% of the building’s replacement value) to reset the clock on building systems and components.

A proactive approach taken by some is to invest in facilities before they reach critical thresholds that threaten reliability of program delivery. Nationally, campuses have been able to renovate a proportion of the over 50 year old square footage, dropping it from 37% of total space (construction age) to 22% of total space (renovation age). That renovated space now shows up in the under 10 and 10-25 year old age groups. However, we find that no net progress is being made on the space in the 25-50 age range. This does not mean that buildings are not being renewed; many clearly are, but with so few of the 10-25 year old buildings undergoing significant renovations, square footage continues to cross the 25 year threshold.
We found significant differences in the renovation age of public compared to private institutions. Public institutions have the largest proportion of space in the 25-50 age range. Some public institutions have made progress on renovating these buildings and resetting the clock on components and systems. Others, with less funding, are seeing their 25-50 year old spaces continue to age without significant renovation and are now crossing into the over 50 category.

Private institutions tend to have their over 25 year old space split between the 25-50 and over 50 year old age categories. While it might appear that private campuses are disadvantaged by this space profile, remember the construction vintage discussion earlier in this paper. Many of these over 50 buildings at private colleges are iconic, historic buildings that are low complexity, durable, and continue to function with minimal investment.
Capital Investment

**Why Funding Source Matters**

Sightlines segments project spending between two different types of capital funding: annual stewardship and asset reinvestment. Annual stewardship is the recurring annual funding that ensures that buildings will perform properly and building components will reach their useful life. We call this the cost of “keeping-up.” Asset reinvestment is the cost of addressing the backlog of repair and modernization of buildings — or “catch-up” costs. When campuses allocate adequate resources to keep-up with building life cycles, they defer fewer projects to their backlog and need less money to catch-up. In fact, we have found that $1 spent in stewardship avoids $3 in capital reinvestment.

For facilities operators, another key advantage of annual stewardship is that its recurring nature makes it more predictable. This funding enables leaders to be proactive about pending critical needs and flexibly apply appropriations to preserve physical assets. When annual stewardship declines, facilities organizations tend to become more reactive as system failures increase utility consumption, daily service costs, and long-term capital needs.

**Capital Investment Over Time**

While construction age, construction vintage and renovation age all play a part in determining the backlog of deferred projects, access to capital over time is truly the trump card that changes the picture at individual and groups of campuses. However, the story is not total spending levels alone. Funding type and project selection must be taken into account to fully understand historical investment patterns.

The capital funding picture for both public and private campuses is significantly different in 2013 than it was in 2009. Although funding has rebounded, campuses in general have not restored capital spending to the 2009 levels, which topped out at over $5 per square foot for public institutions and over $6 per square foot for private institutions.

However, the real difference in project spending has been the increased reliance on annual stewardship funding. By necessity, lack of confidence in future state appropriation or the unwillingness of some institutions to borrow has led facilities leaders to make the case for adding institutional resources to support capital investment. This is truly positive as it represents increased awareness and a commitment to slow the rate of facility deferral.
At public campuses, which do not have a strong tradition of recurring institutionally-sourced capital funds, institutional capital has grown from $0.89 per square foot in 2007 to $1.35 in 2013 — an increase of over 50%. One time capital mainly coming from the state government is at $3.32 per square foot, down from a peak of $3.88 in 2008. The 2013 funding is the second lowest year of state capital funding we have documented since 2007. As one campus leader told us: “We can’t wait for the state to come around with a large capital project once every 10 years. We need to do more to find the institutional resources to invest in our facilities every year. Otherwise we will fall further and further behind.”

At private campuses, institutional capital funds have grown from $1.69 per square foot in 2007 to $2.02 in 2013 — an increase of almost 20%. One time capital at these institutions from gifts, grant or bonds is actually $0.10 per square foot lower in 2013 than it was in 2007, and over $1.00 lower than it was at the peak funding of 2009. We believe this reduction in one-time capital is a result of less bonding by private campuses and fewer large gifts that can be used for facilities improvement. There is evidence that the reluctance of private campuses to take on more debt to solve their facilities problems is directly related to not having the growth in tuition revenue to pay the debt service.
**Backlogs Continue to Grow**

The difference in funding type has impacted the rate of capital backlog growth. Public universities, which in general have lower annual capital budgets and higher “one-time” funding, have a far greater rate of project deferral. We believe that this is due to the flexibility in spending authority. Since project selection with state appropriations is often controlled off-campus, allocations can be spent on large renovations that do not focus dollars towards the most important repair or asset preservation needs. Conversely, increasing annual capital budgets should increase operators’ ability to target high priority project needs that affect building reliability.

Private campuses’ backlogs have grown at a rate of 15% since 2007 compared to 18% at public campuses. There is a $14 per square foot difference between private and public campuses when looking at total backlog.
Despite the economic recovery, both public and private campuses are not able to rely on government funding, gifts, grants or bonds to solve the renovation needs of their aging space profile. Only research institutions, which have the largest enrollment growth and consequently more revenue and access to multiple funding sources (gifts, grants, bonds and, if they are public, state capital funds), are able to maintain their capital funding at high levels over the six years we examined. Other types of institutions continue to struggle to make the capital investment required to address aging facilities.

SPOTLIGHT ON THE UNIVERSITY OF DENVER

The University of Denver has used the concept of building portfolios to optimize capital and increase stewardship.

“Thinking in terms of portfolio management has allowed key campus decision makers to work together to create a plan for funding based on need. This plan has been modeled into the future, and now, we will leave a legacy of funding as opposed to inheriting a legacy of deferred maintenance.”

Craig Woody
Vice Chancellor Business and Financial Affairs
Operations Effectiveness

Facilities Operating Budgets

Facilities operating budgets continue to grow, but at very modest rates. In 2007, the national average actual expenditure on facilities operations, including maintenance, custodial, grounds, planned maintenance, and administration was $4.41 per square foot. By 2013, that expenditure grew to $4.90 — an increase averaging 2% per year and below inflationary/steady state growth needs. There is almost no difference between public and private campuses when it comes to facilities operating budgets. Publics spent $4.88 per square foot while private institutions spent $4.92. However, private campuses did spend about $0.08 more on planned maintenance contributing to efforts to reduce ongoing deferral.

To illustrate the impact of changes made, we have compared spending to steady state adjusted levels. If public campuses were able to fund facilities operations at the rate of inflation, they would be spending $5.22 per square foot in 2013 compared to actual spending of $4.88 — a difference of 7%. Private campuses would be spending $5.33 compared to $4.92 — a difference of 8%. While these differences do not appear to be large, if multiplied by the 1 billion gross square feet in the Sightlines database, the savings realized in facilities operating budgets amounts to $394 million.
With budgets not keeping pace with inflation, most campuses are finding alternative methods to do more with less. We found that both maintenance and custodial coverage ratios have grown with current employees responsible for an increasing amount of square footage. Stronger scheduling systems are in place to manage the leaner workforce. However, at the same time, a greater focus on planned maintenance compounds these daily service issues, but has the long-term effect of reducing repair needs and reactive maintenance.

Although there will always be ways to improve marginal efficiency of the facilities organizations, the prolonged period of budgetary stagnation has eroded the “low hanging fruit.” Yet the pressures to lower costs even further are likely to continue. To affect meaningful operating cost reductions, the campus will need to look beyond operating issues, and instead coordinate space and capital strategies in a meaningful way to modify the institution’s cost structure.
Energy Use and Carbon Emissions

In our 2013 report, we documented that campuses of all types have reduced their energy consumption on a gross square foot basis since 2007. This year there was slightly higher energy consumption, but mainly due to a mild winter in 2012. The overall trend since 2007 remains positive with more than a 6% reduction in energy use per square foot.
When examining total energy use, not normalized by gross square footage, there is almost no difference from 2007 to 2013. This suggests that campuses are using energy savings to offset the increased consumption of newly added square footage.

**SPOTLIGHT ON CALIFORNIA STATE UNIVERSITY – SAN BERNARDINO**

CSUSB has successfully used energy management to improve conditions campus-wide. A favorable commodities market and diligent conservation efforts have led to a nearly 25% reduction in utility spending. The monies saved were recycled by the organization to fund a revised planned maintenance program, envelope and mechanical renewal and continued infrastructure work to compound these savings.
A major contributor to energy efficiency is the growth of natural gas consumption caused by a favorable commodity price. Whereas natural gas equipment tends to have higher generation efficiencies than coal or oil, its benefits go beyond that. Campuses making a fuel switch often invest in improved burners or large scale infrastructure upgrades. In many cases, low gas prices have fostered investment in high efficiency boilers or cogeneration systems compounding the gains.

In 2007, natural gas comprised 75% of all fossil fuels nationally, with oil and coal being the other main sources. By 2013, natural gas comprised 85% of all fossil fuels used by campuses. In the northeast specifically, natural gas grew from 64% of all fossil fuels in 2007 to 82% in 2013; in the southeast, natural gas grew from 76% in 2007 to 93% of all fossil fuels used by campuses in 2013. These are major shifts in energy use in just six years.
The shift to natural gas has also had a significant impact on carbon emissions nationwide. When utility carbon emissions are calculated on both a student FTE and gross square foot basis, there has been a reduction from 2007 to 2013 of over 12%, primarily due to fuel switching to natural gas.

Overall, energy consumption has been on a consistently positive trend over the last six years. It is clear that much of the gains in efficiency have been a result of fuel switching and modest conservation efforts. There are still opportunities to improve energy consumption by addressing the management of primary generation and distribution systems, coordinating infrastructure renewal with new combined heat and power strategies, and improving efficiencies in building systems through effective planned maintenance and capital allocation.
Strategies for Success

While the data present clear challenges for managing campus facilities, there are colleges, universities and systems of higher education across the country implementing strategies to meet those challenges. An easy and overly simplistic answer is a significant infusion of new capital directed at addressing facilities backlogs and ongoing needs. However, we have seen that this is impractical and unlikely. There is simply not enough funding to repair existing buildings, keep-up with the needs of newer buildings and construct more modern facilities to meet the desires and demands of government policy makers, institutional leaders and future students. Therefore, different strategies must be employed to release value from existing assets and optimize scarce capital. To make these strategies work it will be important to give operators the freedom to reallocate operating savings so as to increase campus stewardship. This would have a dual impact — repairing campus today while simultaneously slowing the rate of deferred maintenance.

**Strategy 1: Build strategically.** Project selection for all funding sources must unite mission, finance, and the technical needs of buildings. New construction must support the master plan and future program needs of the university. Implement policies that result in minimal net new square footage until the backlog is reduced to manageable levels. These policies should establish criteria for new space, which include new buildings that are deemed mission critical, address a specific program need, or help to alleviate higher density. A number of U.S. campuses have implemented a “no net new space” policy. This does not mean they will not build new facilities, but instead will balance new construction with elimination of other buildings.

**Strategy 2: Less can be more.** Sometimes less is more when it comes to addressing aging buildings with high backlogs. Consider eliminating or replacing aging space of certain construction vintages with more modern and more efficient facilities. Some states are implementing policies to encourage such elimination or replacement. This “renovation through replacement” approach creates a powerful incentive for campuses to eliminate aging space with high levels of deferred maintenance and on-going maintenance costs. In some cases, campuses can eliminate underutilized space in poor condition. In other cases, when the building has mission critical functions, replacing the poor quality building with a modern facility is less expensive in the long run as it allows the construction of space that best meets program needs and maximizes utilization.
Strategy 3: Look ahead. Set capital priorities that reflect an investment strategy spanning at least five years. Such an approach has proven highly effective at lowering the backlog needs in aging buildings that are determined to be critical to the mission and programmatic needs of universities. The plan should be developed through engaging finance, facilities, student life, and academic leadership in a transparent process that builds constituency rather than competition. Assuming policy makers are persuaded to invest new capital resources to address these needs, such a strategic plan defines clear investment priorities from the top down to address key capital needs for the campus. There is strong evidence in our data that many buildings are already at high risk of failure for key building components. Waiting for building failures to occur will not only result in program disruption, but will also be much more costly than fixing the buildings now. A forward looking vision is needed to define investment priorities and to communicate a logical strategy for the inevitable deferral of some project requests.

Strategy 4: Keep-up. Make annual stewardship (keep-up) investment a priority at every campus. The more a campus can keep-up with life cycles as they come due, the less the backlog grows. Sightlines research shows that keeping up buildings can not only save money by extending life cycles of buildings, but also can give campuses more flexibility in use of one-time capital funding when it becomes available. As a facilities’ best practice, many campuses are creating reserve funds or building endowments so that money is available every year to steward buildings.

Strategy 5: Reward savings. Establish facilities’ operational practices that are proactively extending the life cycles of key expensive building components, like HVAC, electrical systems and roofs. A Sightlines study of public universities in one U.S. state found that campuses that increased planned and preventative maintenance over time by 65% or more saw a 25% reduction in total work orders (planned, preventative and corrective). Proactive maintenance is not only a good idea when it comes to managing university facilities, it will save money in the long-run. We have also found campuses that provide incentives to facilities operators who make buildings run more efficiently (lower maintenance, custodial or energy costs) by reallocating the savings to increase annual capital budgets – stewardship. The payback in capital is three to four times the value of the savings reallocated.
Final Thoughts

The challenges facing today's facilities leaders are great, but they are not insurmountable. Institutional leaders across the country are thinking creatively to develop new ways to lower operational overhead and optimize capital resources. Sightlines looks forward to being a part of this conversation on our member campuses. For more information on the material contained in this article, please contact us at insights@sightlines.com or 203.682.4950.
About Sightlines

Sightlines gives colleges and universities the independent data and perspective they need to make critical decisions about their most valuable assets — their facilities. Sightlines has compiled the industry’s most extensive, verified database, allowing us to benchmark facilities against universities and colleges across the nation. More than 400 campuses rely on Sightlines to help make the most of finite resources. We are reinventing how facilities are managed in higher education.

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