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The Economy's Influence on Environmental Sustainability and Energy

Including the Top Ten Facilities Issues

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SECTION I: Executive Summary

Since 2006, the APPA Thought Leaders Series has brought together experts in higher education for two days of discussion about the challenges facing colleges and universities in North America. The major difference between the 2009 event and those of years past was a sense of urgency. Discussions had an added level of intensity, particularly over the implications of the economic recession and the growing demand for **environmental sustainability and energy efficiency** on campus.

Energy and the environment were the focal points for the 2009 Thought Leaders Symposium, and the result is this whitepaper, which considers the major challenges posed by environmental sustainability to higher education institutions. Like all sectors of the economy, higher education is affected by issues such as fluctuating energy prices. However, many in higher education believe colleges and universities have a unique obligation to leadership in environmental action. Thought Leaders symposium participants believe that higher education can play a major role in making the entire economy more sustainable by pioneering critical research, testing new technologies and strategies on campuses, and educating the next generation of scientists, businesspeople, politicians, and citizens.

During the symposium, participants heard from experts on different aspects of energy use and environmental sustainability. They also broke into working groups to identify specific challenges to implementing sustainability and energy management strategies on campus. The economic situation was never forgotten—for each major issue, teams evaluated the implications of the global recession. In the end, the following major points were established—points that became the outline of Section II of this paper:

Environmental Sustainability

- Challenges to sustainability at colleges and universities:
  - Short-term decisions that are made without considering **long-term goals.**
  - The lack of a **business case for sustainability.**
  - A **budget model** at colleges and universities that hampers comprehensive thinking.
  - A **culture** that hasn't embraced sustainability.
- Impact of the global recession on sustainability efforts:
  - **Short-term thinking** that hampers long-term investment.
  - Using the economic situation as **an excuse not to act.**
- Strategies higher education can use to respond:
  - Rely on leaders to **drive change** on their campuses.
  - Increase **communication** among all stakeholders.
  - **Demonstrate success** with high-visibility projects.

- The role of higher education:
  - Draw on the **intellectual capital** on their campuses.
  - Educate the **next generation** of environmental leaders.

Energy Issues

- Challenges to energy action at colleges and universities:
  - Energy will become a **concern for all departments**, not just facilities.
  - **Uncertainty and volatility** in energy markets pose significant risk.

- Impact of the global recession:
  - Demand is increasing to **reduce energy costs**.
  - New energy concerns are **institution-wide**.

- Strategies higher education can use to respond:
  - Take short-term actions with **long-term vision**.
  - Develop **incentives** for increasing conservation.
  - Develop approaches that **reduce risk**.
  - **Diversify and leverage** funding sources.

- The role of higher education:
  - Conduct vital **energy research**.
  - Provide a forum for **experimenting with different energy strategies** and conservation programs.
  - Create and leverage **partnerships** with alumni, civic leaders, utility companies, and other institutions.

Section III of this report shifts the focus to a discussion of the response of facilities leaders to higher education's challenges. Thought Leaders symposium participants believe strongly that facilities departments must play a central role in green projects since the campus's built environment generates a significant percentage of an institution's carbon footprint. Furthermore, facilities leaders bring in-depth understanding of energy and building issues to the table; they can provide information, insight, and perspective to other campus leaders. Finally, facilities leaders have a unique perspective of the campus as a whole, a perspective that is invaluable in developing sustainability strategies.

Section IV focuses on the top critical issues confronting facilities leaders in 2010. While rooted in the discussion of environmental sustainability and energy issues, Thought Leaders symposium participants expanded their focus to address the top ten critical facilities issues:

1. Adjusting to the new sustainability reality.
2. Developing an institutional vision of sustainability.
3. Creating a leadership role for facilities managers in addressing sustainability.
4. Confronting economic challenges.
5. Fixing broken budget models.
6. Managing rising energy costs and energy volatility.
7. Engaging the campus to address energy challenges.
8. Managing space.
9. Prioritizing renewal needs.
10. Meeting the challenges of workforce development.

As well as discussing each of these critical facilities issues, the paper delves further by proposing several questions that facilities departments use to help understand how their organization is positioned for the future and to develop strategies for improvement.

As the Thought Leaders Series completes its fourth year, it remains clear that the need expressed at the first symposium for dialogue between educational facilities professionals and the rest of the academic community has not gone away. If anything, its importance has grown. The challenges facing educational institutions are many, and the solutions will be as varied as the institutions themselves.

And so both APPA and the participants at the Thought Leaders symposium urge you to consider the specific challenges facing your institution in light of these trends and issues. How is your campus responding to environmental challenges? Have campus leaders committed to sustainability, or do environmental efforts remain scattershot? How have recent fluctuations in energy prices affected your campus? Are you making efforts to increase energy efficiency or investing in green energy sources? How has the economic recession affected your thinking about sustainability and energy?

We look forward to your feedback as the dialogue continues.

SECTION II: Critical Concerns Facing Higher Education

Two of the most important issues facing higher education in the next decade are environmental sustainability and energy challenges. In fact, these two issues are closely related, and energy challenges are often considered a subset of sustainability. However, Thought Leaders symposium participants consider energy challenges so critical to college and university campuses that the topic is addressed separately in this report.

Participants considered these issues and asked questions about specific challenges, best strategies to prepare for the future, and how the recession is affecting higher education's approach. A final consideration was the role of higher education in setting an example for environmental awareness and energy efficiency and demonstrating the effectiveness of new approaches.

Environmental Sustainability Initiatives on College and University Campuses

Background and context of environmental sustainability initiatives. While green initiatives are underway in all sectors of the economy, higher education has become particularly focused on environmental sustainability. Efforts ranging from bike rental programs to recycling campaigns, from ecology courses to organic farms, are underway at campuses across the U.S. and Canada. Sustainability is a wide field, including efforts at reducing environmental impacts, cutting carbon dioxide emissions, promoting green jobs and technologies, reducing waste, eliminating toxins, and generally encouraging awareness of the human impact on natural systems.

Campuses have been a hub of environmental activism since the birth of the movement. Earth Day 1970 marked the start of intense interest in ecology. Environmental efforts for the next 30+ years were widespread but sporadic, but starting in the early 2000s the calls for meaningful, substantial sustainability became impossible to ignore, particularly from student and faculty activists. Higher education institutions also came to realize that sustainability mattered to potential students and donors. The American College & University Presidents Climate Commitment, launched in December 2006, became a tipping point for many institutions, and momentum has steadily grown for campus leaders to sign the pledge to make their institutions carbon neutral. By 2008, campus-wide

Data Point: Defining "sustainability"

Higher education has a special call to be green

Higher education is beginning to recognize the need to reflect the reality that humanity is affecting the environment in ways that are historically unprecedented and that are potentially devastating for both natural ecosystems and ourselves. Since colleges and universities are an integral part of the global economy and since they prepare most of the professionals who develop, manage, and teach in society's public, private, and non-governmental institutions, they are uniquely positioned to influence the direction we choose to take as a society. As major contributors to the values, health, and well-being of society, higher education has a fundamental responsibility to teach, train, and do research for sustainability...

'Sustainability' implies that the critical activities of a higher education institution are ecologically sound, socially just, and economically viable, and that they will continue to be so for future generations. A truly sustainable college or university would emphasize these concepts in its curriculum and research, preparing students to contribute as working citizens to an environmentally healthy and equitable society. The institution would function as a sustainable community, embodying responsible consumption of energy, water, and food, and supporting sustainable development in its local community and region.

— From the Association of University Leaders for a Sustainable Future

environmental sustainability initiatives had become practically mandatory for higher education. For example, as of this writing, 680 campus leaders have signed the Presidents Climate Commitment, representing one-third of the student population in the U.S. Even institutions that chose not to sign the pledge have created sustainability programs.

All this momentum hit a speed bump in late 2008 when the recession hit college and university campuses. The effect was immediate. College endowments lost an average estimated 22.5 percent of their value in the first five months of 2009, according to the *Chronicle of Higher Education*. Declining tax revenues resulted in state budget shortfalls and corresponding cuts in funding to public institutions. Reductions in state support reported around the country ranged from 5 percent to more than 15 percent, with universities in California, Hawaii, and Washington suffering cuts of at least 20 percent in 2009, according to the *Chronicle*. State and local funding of community colleges also dropped, even as enrollment at

Data Point: Making a business case for sustainability

Why uncertainty shouldn't get in the way of action

Many business leaders on college and university campuses hesitate to take decisive action on environmental and energy issues since so much is still unclear about both the problems at hand and their solutions. Part of making a business case for sustainability must involve addressing these concerns head-on and insisting that action shouldn't wait for certainty.

1. **We don't know how long it may take.** This is not a short-term problem with a near-term solution. It goes beyond the tenure of many who will be charged today with beginning the process to reduce the campus carbon footprint. However, clear progress can be made in the short-term, and even if the end-game is many years ahead, action needs to begin now.

2. **We don't know the perfect way to proceed.** There is neither a straight path to carbon neutrality nor a one-size-fits-all-institutions solution. Specific approaches will vary based on an institution's size and mission, its geographic location, and numerous other factors. What is known is that the best strategies will employ multiple long-term and short-term tactics simultaneously to bring about as dramatic a reduction in greenhouse gas emissions as possible.

3. **We don't know what new solutions will emerge.** As one example, while the idea of carbon capture and sequestration is being explored for its potential for safely storing emissions rather than releasing them into the atmosphere, those market technologies and processes are only beginning to be understood. Other helpful breakthroughs are likely to occur but it would be naïve to assume that a magic bullet will emerge to save the day. We must act now on the basis of current knowledge,while remaining ready to shift our approach as opportunities arise.

4. **We don't know how much it will cost.** Most likely, it will cost a lot, but inaction could prove far more expensive. By all indications, climate protection legislative and regulatory requirements for reducing carbon emissions are forthcoming and are certain to factor into the cost of future business operations. Some states already have legislation on the books aimed at compliance with carbon limits, or are introducing their own forms of cap-and-trade systems or carbon taxes that provide incentives to reduce greenhouse gas emissions. Similar actions are expected to follow at the national level. Fines for emissions and the cost of purchasing offsets are expected to rise precipitously as a shared standard emerges for how to value carbon. Institutions that show leadership in getting ahead of the climate change issue now will be well positioned to pay far less in the future.

— ***Excerpted from* The Educational Facilities Professional's Practical Guide to Reducing the Campus Carbon Footprint, *published by APPA, written by Karla Hignite, 2009.***

these institutions soared. While economists say the recession is coming to an end, its effects continue on campuses, with no end in sight. Both public and private institutions face budget shortfalls going into 2010, and many have resorted to hiring freezes, eliminating staff and adjunct positions, collapsing course offerings, deferring maintenance, halting new construction programs, and raising tuition and fees.

Challenges to sustainability. Participants at the Thought Leaders symposium agree that higher education faces an unprecedented challenge of implementing major sustainability efforts during a time of economic hardship. While deeply concerned about the impact of the recession, they nevertheless express a sense of urgency regarding environmental issues, an imperative to make major strides in sustainability. A consensus arose that sustainability must remain a priority no matter how difficult it will be to achieve. As a society—and as the education institutions of that society—we cannot wait to make meaningful changes to save our environment.

However, substantial roadblocks stand in the way. One of the major issues relating to sustainability for higher education is a **disconnect between short-term decisions and long-term goals**. Particularly in this time of budget belt-tightening, Thought Leaders participants believe college and university leaders can make logical decisions for the immediate situation but in the long run discourage sustainability. For example, while deep into a building project, institutions are faced with choices about materials and systems that have lasting impacts on energy costs and efficiency; a short-term decision to save money on an air-conditioning or heating system can have significant long-term costs in terms of energy expenses. Short-term decisions to eliminate staff and cut pilot programs can also reverberate for many years into the future; it can take years to regain expertise lost when employees leave or regain the momentum lost when sustainability programs are shuttered.

A second challenge identified by Thought Leaders participants is that **a business case hasn't been made for sustainability**. Higher education institutions may claim a commitment to environmental action, but when boards and presidents start poring over their budgets looking for places to cut, that commitment comes under fire. If the institution is basing its environmental decisions on a general social sense that sustainability is "the right thing to do," it's going to be easy to back away from action. Hard choices have to be made in hard times, and financial managers need to be engaged in developing the institution's business case for long-term sustainability programs.

The key to making the business case is to research and quantify the financial implications of institutional actions and compare them with various alternatives, including the choice of doing nothing at all. This means digging into the financial implications of options such as creating a smart grid for your campus or installing solar panels to produce energy. A comprehensive proposal to business leaders for such projects would include details of both upfront and annual costs along with tangible and intangible benefits and detriments. Fortunately, resources are available to make this process easier; for example, APPA, NACUBO, and SCUP published *The Business Case for Renewable Energy: A Guide for Colleges and Universities,* which walks institutions through the process of gathering the information needed for a detailed proposal about renewable energy projects. The book provides guidance on various technologies, ownership options, relationships with utilities, and financing strategies—everything you need to make a bullet-proof case for a sustainability project.

A final challenge is posed by the **broken budget model** of colleges and universities. Higher education institutions rely on a bewildering array of funds, each with its own strings attached. Annual operating funds, capital funds, recapitalization funds, revolving funds, federal grants and contracts, state bond proceeds, foundation grants—each is a separate pot of money that operates independently from the rest. This disparate system has a significant impact on university sustainability, as it interferes with the comprehensive, long-term view that is necessary for campus-wide environmental action.

The consequences are particularly severe in the context of higher education facilities, since the total cost of ownership of any building isn't realized on one budget. In other words, the funds to construct a building come from different sources than the funds to operate and maintain the building, leading to a mistaken notion that the "cost" of a building is only its upfront construction. In fact, the *total cost* of building ownership includes lifetime costs of a structure, from design through maintenance through renovations through

Data Point: The greening of college sports

Athletics remain largely untouched by sustainability projects

While sustainability efforts seem to be reaching every corner of most college and university campuses, certain areas still are off-limits: football stadiums, swimming pools, tennis courts, and basketball arenas. Higher education sports programs have largely remained unaffected by sustainability efforts and seem likely to remain that way into the near future.

A survey of 97 NCAA Division I-A athletics programs found that only 10 percent have developed a strategic plan for sustainability, according to the 2009 Collegiate Athletic Department Sustainability Survey, conducted by AASHE. While nearly three-quarters of respondents said the emphasis on environmental programs was growing, athletic program leaders were more worried about the bottom line—many said they were concerned about the return on investment of sustainability programs.

This is despite the fact that athletic programs are some of the biggest energy users on campus. In a study of energy use at different buildings on the Pomona College campus, three of the top four energy users per square foot were sports facilities, two swimming pools, and a tennis complex. The environmental impact of other athletics activities such as team and fan travel wasn't even measured.

Shifting the mindset of teams of coaches to make sustainability a priority will likely be one of the biggest hurdles in greening the college campus, but student and fan efforts may lead the way. At the University of Florida, for example, the TailGator Green Team made up of student volunteers spread out across the campus on football game days collecting recyclable trash. In 2008, more than 25,700 pounds of cans and bottles were diverted from landfills.

demolition. When buildings are designed with total cost of ownership in mind, they are constructed to be more energy efficient, easily maintainable, and generally sustainable. Higher education needs to develop budget approaches that are less fragmented and more comprehensive—approaches that actually encourage a big-picture view of the campus, its facilities, and their life cycle.

Finally, a fundamental challenge for institutions regarding sustainability is the culture of higher education. **The entire culture needs to change to incorporate sustainability.** As long as sustainability is marginal—a pilot program, a student-run initiative, a niche academic field—it will be subject to cuts. For sustainability to really have an effect, it must shape institution-wide thinking. Sustainability needs to be framework for evaluating processes, crafting policies, and making decisions. Only then will the hard decisions get made, decisions that will change the institution, overturn long-held conventions, and reshape higher education. Further, only with widespread cultural change will sustainability gain the momentum it needs to succeed. Sustainability isn't something that can be "fixed"—these issues won't be resolved in three or four years. It will take decades of sustained effort to make college and university campuses carbon neutral.

Impact of the global recession. The other significant challenge to sustainability in higher education is, of course, the economic recession. With their endowments shrinking before their eyes and state legislatures axing their support, colleges and universities have had to cut everything in sight—including campus sustainability programs. A May 2009 survey by the Campus Consortium for Environmental Excellence (C2E2) found that 80 percent of college and university environmental, health, and safety departments faced budget cuts for the next fiscal year.

Short-term thinking is hampering long-term investment. Institutions can't hire new staff with new skills; they can't invest in training or educational programs; they can't undertake long-term projects with uncertain outcomes. Furthermore, when every budget is at risk, the instinct is to protect your turf. This forces silo thinking, in which every department and division turns inward and jealously guards its ground. This attitude is antithetical to sustainability, which requires a big-picture

understanding of issues across the campus, the region, and the world. Sustainability programs only work with the traditional walls are broken down and groups work together toward a common goal. In this fraught recessionary environment, that sort of cooperation becomes increasingly hard to achieve.

Further, Thought Leaders participants fear that the **economy can become an excuse not to act**. Institutions fall back on what they know during tough times—they resist the unknown. It would be all too easy for a cash-strapped campus to wash its hands of sustainability, perhaps promising to revisit the problem when times get better. Symposium participants agree that maintaining momentum on sustainability will be one of the greatest challenges of this recession.

Impact on different types of institutions. Clearly, different types of higher education institutions will face a variety of sustainability challenges. Large research universities face the greatest obstacles to sustainability as a result of their large campuses and resource-intensive research programs—the environmental impact of a history or modern languages program is a fraction of that of an electrical engineering or biochemistry program. Most also face the challenge of reduced state funding. On the other hand, large campuses can have greater economies of scale, which can produce greater payoffs for sustainability investments. Most have centralized systems for air and water, so improvements can be made in one place to impact the entire campus. Research institutions can also bring their expertise to bear on the problem and the institution can become a proving ground for new technologies and approaches.

At the other end of the spectrum, community colleges also confront significant challenges to sustainability because they run such a tight ship and have little wiggle room to implement new initiatives. There is some indication that two-year colleges are overrepresented among signatories of the Presidents Climate Commitment, and many have failed to meet the schedule for fulfilling certain obligations of the pledge, according to an analysis by *The Chronicle of Higher Education*. "Most [delinquent institutions] are small colleges or two-year institutions, both with presumably fewer resources to throw at sustainability efforts. Colleges that may have had ambitions for sustainability programs a year or two ago might now be reorienting their priorities in the economic downturn," noted the *Chronicle*.

Further, these campuses are currently so overwhelmed with students that it's hard for sustainability to get priority on their agenda—they're too busy trying to fit

Data Point: The recession and community colleges

Associate-granting institutions burn the midnight oil

U.S. community colleges got a one-two punch from the recession: slashed budgets and booming enrollment. Directors of community colleges in half of U.S. states reported in the fall of 2009 that they expected midyear reductions in state appropriations, according to the National Council of State Directors of Community Colleges. At the same time, enrollment is off the charts—between 2007 and 2008, community college enrollment jumped from 3.1 million to 3.4 million, and the record-setting enrollments on many campuses in the fall of 2009 point to even greater growth in the 2009-10 academic year. Some colleges in California, for example, have reported increases of 35 percent.

Community colleges have had to scramble to meet the surge in demand. They've put makeshift parking lots in tennis courts, rented office space for classes, and generally crammed the schedule as full as it can go. In fact, so high was demand at Boston-area Bunker Hill Community College that it took night class to a whole new level—two courses were added that run from 11:45 p.m. to 2:30 a.m. Students study introductory psychology and essay writing in the dead of night fueled by coffee and cookies; Wick Sloane, the instructor for the writing course, pumps himself up with pushups before class starts.

Other colleges are also embracing the trend, saying not only do the late-night classes relieve the burden on overcrowded classrooms, they also appeal to shift workers. Illinois Central College, for example, offers Night Owl classes including Introduction to Jazz and Medical Ethics, and Clackamas Community College in Oregon provides graveyard welding classes that run between 10:00 p.m. to 2:00 a.m.

students into classes. Fortunately, the environmental footprint of these institutions is generally smaller than that of residential and research campuses, so they don't have as far to go. The only area in which community colleges generally have a disadvantage is in transportation, since their students commute. Data collected by the ACUPCC shows that 50 percent of community college gross greenhouse gas emissions comes from commuting, compared to 11 percent for baccalaureate colleges and universities.

Private colleges and universities have the most flexibility to implement sustainability programs, although lately budget shortfalls have limited their options. Since operating budgets are driven by enrollment, if enrollment is down, it will be hard for the institution to move ahead with sustainability programs. Nevertheless, a smaller organization makes it easier to assemble teams across disciplines to achieve consensus about sustainability priorities.

Strategies higher education can use to respond. Thought Leaders participants set out several strategies that colleges and universities can use to respond to the challenges of sustainability.

First, **leaders need to drive change**. Without engaged, committed leadership, sustainability efforts will falter. That leadership shouldn't be limited to a campus sustainability officer but should come out of different divisions and departments. Dynamic leaders can come from almost any discipline—what matters is that they can move the campus toward its goals. In addition, this

Data Point: Conservation communication

Oberlin College shows students how much energy they're using

In a recent experiment at Oberlin College, round, glowing lights were installed on the walls of a residence hall. The orbs were tied to the energy metering system for the building and changed colors in real-time based on energy use in the building. Bright red meant high consumption, yellow meant average, and green indicated below-average usage. Just being aware of the energy output of the dorm motivated residents to cut back on power—energy consumption dropped by more than 50 percent.

Data Point: Developing new sustainability metrics for higher education

Allowing campuses to measure what they want to manage

Researchers at Yale University looked at the challenge of measuring sustainability on college and university campuses, focusing their attention on the challenge of coming up with metrics that were realistic, useful, and effective in guiding decision making. They noted that many sustainability goals outline by institutions are either arbitrary or are "long-term ideals that offer no information on the path to achieve them."

The team proposed a process that would break goals into short, medium, and long terms to accommodate the timeframes required to achieve significant change. They also proposed methods to set goals based on multiple sources of information:

Timeframe	Process by which metric target is established
Institutional (up to 12-20 years)	Multiple stakeholder consensus given present-day circumstances
Generational (mid-term, up to 50 years)	Scientifically based "green" scenarios, if available, and in-house projections of historical trends into future
Visionary (up to 100 years)	Theoretically ideal target

Efforts such as these will help institutions develop the tools they need to evaluate and manage sustainability.

leadership needs to be long-term, able to sustain momentum over the long haul. Too often, Thought Leaders participants believe, campus leadership is short-term, driven by immediate goals. A new chancellor or president wants to make his or her mark on the campus, achieve a few limited, high-profile goals, and move on to the next campus. Sustainability requires a greater commitment over a longer time.

Second, sustainability requires **communication among all stakeholders**, particularly as sustainability choices become more difficult and the cost and effort required become greater. Communication is critical to break down barriers between departments and discipline, between town and gown, even between competing institutions. Successful institutions reach out to anyone and everyone who can help the campus achieve its goals. That might mean coordinating space requirements between different departments, partnering with local utilities, or creating research programs with a competing university. In addition, communication is essential to changing the culture of the institution so that the entire campus is focused on the same goals. It is not enough to communicate happy goals about saving the planet, nor is overwhelming stakeholders with data and statistics a useful approach. The most effective communications is straightforward and action-based. For example, a program could inform individuals about how much water they are using (or waste they are generating, or energy they are consuming) and then provide concrete steps on how to reduce that figure.

Finally, higher education institutions need to **demonstrate success**. Making the business case for sustainability comes down to having figures that prove that sustainability is not only for the greater good but also a smart economic decision for the institution. Campuses need to engage in constant measurement and assessment of their progress. Rigorously documented pilot programs give the institution the data it needs to convince skeptics that sustainability gains can be made without breaking the bank. To get the right data, institutions may need to develop new metrics that better illustrate the problem and point toward a solution. Thought Leaders participants argue that current metrics fail to meet the needs of the new sustainability challenge. By carefully evaluating the institution's goals, campuses can determine what they need to measure and put the right metrics in place.

The role of higher education. Despite the challenges inherent in the greening of the university, higher education has a unique role to play in sustainability. Even with all its limitations, higher education can do things no other sector of our economy can do. Colleges and universities have an **unmatched resource in the intellectual capital on their campuses**. Across the U.S. and Canada, students and faculty members are turning their minds to the myriad problems besetting our environment. Every day, they make steps toward a more sustainable future. Certainly the private sector conducts research, as does the government, but their efforts pale in comparison to the fundamental investigations underway at colleges and universities. In fact, if higher education didn't do this research, no one else would. Without higher education's contribution, our society will lack the crucial information it needs to solve global problems.

Higher education shapes the next generation of environmental leaders. The problems of the environment won't be solved in the next five or ten years—it will take future generations to undo the harm of previous generations. Those future generations will be trained and educated in today's colleges and universities. Higher education is taking on the challenge of training a new generation of students who have the skills to confront issues of water, air, and energy.

A 2008 survey by the Council of Environmental Deans and Directors, operating under the University Affiliate Program of the National Council for Science and the Environment, identified 1,182 environmental degrees available from 652 U.S. colleges and universities; on average, 33,000 undergraduate and 9,000 graduate students every year are enrolled in these programs. In addition, higher education is also promoting environmental awareness among the general student population, so even students in fields other than environmental studies leave the university with a basic understanding of conservation and sustainability. All signatories of the ACUPCC are required to "make climate neutrality and sustainability a part of the curriculum and other educational experience for all students," and colleges and universities are increasingly making sustainability courses part of their core curriculum for all students. The end result will be a generation of citizens with an in-depth understanding of sustainability issues and the skills to create a green future.

Data Point: Renewable energy credits and carbon offsets

Critics charge greenwashing; advocates argue for green investing

One option for colleges and universities seeking to reduce their carbon footprint is to buy renewable-energy credits, or RECs. Institutions pay a premium to buy green energy from sources such as wind or solar power; the credits are intended to cover the additional cost of green-energy production and encourage providers to invest in renewable projects. These credits were invented because it's impossible to direct energy from any particular source—such as a wind farm—to any particular user; once it hits the grid, energy is energy. RECs allow institutions to claim they are using energy from renewable sources without actually building those sources themselves.

However, RECs remain controversial, with many critics claiming they don't actually reduce greenhouse gas emissions. It's often unclear, for example, if the RECs actually pay for a renewable energy project that wouldn't have been built anyway. Further, critics claim campuses would be better off reducing consumption than buying more energy.

Even more controversial than RECs, however, are offsets. Offsets involve sequestering or conserving carbon dioxide in an amount equal to that emitted by the campus. For example, a campus might invest in a tree-planting project or invest in program to replace incandescent lightbulbs with compact fluorescent bulbs in the community. Many critics have mocked offsets as simply a way to spend yourself green and perpetuate complacency. Others have claimed that offset credits are difficult to calculate, since projects such as tree farms take decades to capture carbon, and can be counted multiple times in multiple ways.

Nevertheless, many campuses have made both RECs and offsets critical parts of their energy plans. Experts recommend, however, that institutions make careful study of any REC or offset proposal before investing. As interest has grown in these approaches, information has become available to help institutions make smart decisions, such as the ACUPCC's Voluntary Carbon Offset Protocol, which offers guidelines on selecting carbon offsets that will actually help the environment, not just relieve some guilt or enhance an institution's image.

Campus Energy Issues

Background and context of energy challenges. For the history of most colleges and universities, energy was cheap and plentiful—barely a consideration for higher education. All that changed in the 1970s, when the OPEC oil embargo resulted in skyrocketing petroleum prices. Suddenly, lines formed at gas stations across North America, energy conservation was all over the news, and Congress poured funding into research and development on alternative fuels. But then gas prices went down and all the fears went away. The difference can clearly be seen just in terms of energy research funding—after a peak in the late 1970s, energy industry spending on research and development fell by almost three-quarters, while Department of Energy funding dropped from an average $7 billion annually (adjusted for inflation to 2008 dollars) to $3 billion annually during the next 30 years, according to the Congressional Research Service. Meanwhile, higher education institutions invested in buildings built on the assumption that energy costs would remain low.

The picture started to change in the late 1990s and early 2000s as global warming became a major concern. With the news full of images of melting glaciers and average world temperatures on the rise, attention focused on the impact of carbon dioxide emissions on the climate. Investment in alternative energy sources such as wind, solar, and geothermal power became seen as a means for reducing reliance on burning fossil fuels and adding carbon dioxide to the environment. The ACUPCC draws on this train of thought by asking campuses to pledge to become "carbon-neutral," with no net contribution of carbon to the environment.

However, in the business offices and facilities departments of colleges and universities, attention shifted back to energy costs when oil prices shot up again. From 1985 to September 2003, the inflation-

adjusted price of a barrel of crude oil generally remained under $25/barrel. In 2003, the price rose above $30; it reached $60 by August 2005 and peaked at nearly $150 in July 2008. Energy was no longer cheap nor plentiful. Green energy sources became appealing in an entirely different way because they provided an alternative to oil and natural gas. Conservation became a high priority when energy bills reached unexpected heights. The recession both helped and hurt the energy situation. On the one hand, the recession actually marked the end of the energy cost spikes. When consumers cut back on travel and demand for products dropped, reducing global shipping, worldwide oil demand fell and triggered price reductions. On the other hand, the recession coming hard on the heels of the energy crisis brought home the message that energy uncertainty was not a temporary blip but a new normal.

Data Point: Submetering for labs and research facilities

Calculating the energy load of the most demanding buildings

College and university laboratories generate a constant stream of energy, energy that lab users are rarely aware of. Submetering for labs could help the students, faculty, and staff working in labs better understand their energy use so they could manage it better.

The International Institute for Sustainable Laboratories, with support from the U.S. Department of Energy and the Environmental Protection Agency, recently worked with industry professionals, technology providers, lab managers, and organizations including the International Society for Pharmaceutical Engineering and Lawrence Berkeley National Laboratory, to explore technologies and best practices for lab submetering. The team developed strategies for capturing data, organizing and presenting that information, automating processes, and promoting changes in operations and maintenance. Projects such as this should help institutions find better way to assess and manage energy even in the most challenging of environments.

Challenges to energy action. Thought Leaders participants agree that energy issues will remain a priority for colleges and universities for many years to come. One resulting challenge is that **energy will become a concern for all departments, not just facilities**. In an era of cheap energy, most university programs didn't worry about their energy use. That hands-off attitude won't be possible in this new era. Individual programs and departments will need to be aware of their energy consumption and made to take an active part in improving efficiency. Already, some campuses have begun metering individual buildings and even individual floors and labs. This is going to be a major adjustment for faculty and staff who could always ignore energy use in the past.

Another concern will be energy price fluctuations. **Energy uncertainty and volatility pose significant risk to institutions.** For most of the 20th century, higher education institutions could predict with relative certainty from year to year how much they would have to pay for energy. That certainty has faded in the 21st century—and uncertainty creates risk. As a result, higher education institutions will start looking for any way possible to manage that risk. Campus leaders will need to aggressively pursue energy conservation, as a way to reduce energy demand. They need to broaden their energy portfolio to include green energy sources so that instead of relying on one method of energy production they can spread the risk across a variety of sources.

Some institutions choose to contract with utility providers for green energy, committing to buy power from wind farms, for example; others are investing in renewable energy power production themselves. For example, Vermont's Middlebury College invested in a wood-chip and oil-fired cogeneration plant that should allow the institution to cut its fuel oil use in half while reducing carbon emissions by 12,500 tons annually. Other colleges and universities are installing solar panel arrays and wind farms; Colorado State University, for example, is working on a project to create a massive wind farm that would provide more energy than the campus itself needs. Finally, institutions need to think creatively about strategies to hedge against spikes in energy costs when they come.

Data Point: Locking in energy prices

Are fixed energy contracts the solution to energy cost volatility?

Several colleges and universities have tried to reduce their exposure to energy volatility by locking in energy rates with utility companies. For example, Loyola University of Maryland contracts to purchase between 70 and 80 percent of its energy at a fixed rate to eliminate uncertainty, buying the rest on a floating basis. Concordia University in Austin, Texas made a ten-year commitment with Austin Energy's GreenChoice Program, locking in rates of 2.85 cents per kilowatt hour.

For Concordia, it was a great deal—the institution can make plans for the immediate future knowing exactly what it will pay for energy. While the university paid more at the beginning for its power, over time the cost of conventional energy such as natural gas has risen above what it is paying for primarily wind power.

However, the strategy has risks. Loyola, for example, purchased about a quarter of its energy in July 2008, when the price of oil reached its peak. Now the institution is stuck with that price even though rates have gone down. At the end of the day, fixed energy contracts are a gamble, and even experts find it extremely difficult to predict movements in the market. Nevertheless, some campus leaders look to long-term predictions that energy prices will only go up in the future and make the commitment to fixed-price contracts. Ultimately, institutions will have to weigh the risk of misreading the market against the risk of energy volatility.

Impact of the global recession. As the recession continues to affect college and university budgets, and any line item that can be cut, is cut, **pressure is increasing to reduce energy costs**. Conservation is a challenge on both the micro and macro level. First, many small, individual decisions add to up to create a university's total energy output. Leaving a light on, keeping a fan going, adjusting the thermostat by a few degrees: by themselves, they require little electricity, but altogether they pack a big punch. Measuring that output on a more discrete level becomes critical—people need to know how much energy they are using. Equally critical is the process of communicating how energy use can be reduced so that individuals feel they are having an impact. At the same time, major conservation achievements can be made through major facilities projects. The impact of efforts such as converting lights to energy-efficient fixtures, installing new insulation in old buildings, or upgrading to efficient HVAC equipment can be significant—and often have an excellent return on investment—but nevertheless require major upfront investment. Finding room in the budget for those kinds of investments in the midst of a recession is a challenge.

A second major challenge of the recession in terms of energy is that it puts pressure on **a wide range of institutional processes and operations**. Athletics, housing, food service—all need to be reassessed to determine how much energy they are using and new strategies need to be put in place to cut that energy use. Processes such as budgeting and space management also need to be analyzed so that the institution understands their energy effects. Fundamentally, the need is for the same kind of shift in culture as discussed in the sustainability section—for an overall change in attitude that looks at every aspect of the campus for opportunities to reduce energy use. Colleges and

Data Point: Higher education and energy

By the numbers

- 240,000 buildings
- 5 billion square feet of floor space
- $15 billion to $18 billion in new construction and renovation each year
- $20 billion annually for facilities maintenance, operations, and utilities
- On a typical campus, 70 to 90 percent of direct greenhouse gas emissions are due to buildings.
- Higher education accounts for about 5 percent of U.S. commercial building sector greenhouse gas emissions.

universities that have adopted this attitude have identified significant opportunities for improvement; for example, in a study of one building on the Penn State campus, the Mueller Lab Building, researchers found ways to reduce emissions by one-third, cut 1.8 million kilowatts per hour of energy consumption, and save more than $45,000 a year.

Impact on different types of institutions. Energy issues pose the greatest challenge for large research and comprehensive institutions. These campuses have a wide variety of buildings on large campuses; they operate 24 hours a day, seven days a week. Both laboratories and athletic facilities place huge demands on the electrical grid, as do dormitories. Dorms have recently become the focus of energy conservation efforts on many campuses; programs are underway to install energy-efficient lighting, create recycling programs, and use submetering to give feedback to students. Research institutions also have the largest electrical, water, and HVAC systems, many decades old, and renovations to those systems require significant investment. On the other hand, improvements to these centralized systems can have a major impact across the entire campus.

Private and liberal arts institutions generally consume less energy than research institutions, although they still face the challenge of controlling energy costs in residence halls. One advantage for these colleges and universities is that they have a relatively uniform energy profile. That is, their programs change little from year to year, so their energy uses don't fluctuate significantly. This helps reduce risk from energy volatility.

According to self-reporting through the ACUPCC, community colleges have the largest average gross carbon dioxide emissions per 1,000 square feet: 29.02 metric tons in comparison to the 15.16 metric tons from baccalaureate colleges and 21.3 from doctorate-granting institutions. However, nearly 50 percent of these emissions come from commuting, compared to 11 percent from baccalaureate colleges and 13 percent from doctorate-granting institutions. A major challenge, then, for community colleges will be helping students and faculty find more energy-efficient ways to get to and from campus. It's extremely difficult, however, for commuting to become a major priority for these institutions in the face of swelling student demand and rising costs.

Strategies higher education can use to respond. Despite all of these challenges, participants at the Thought Leaders symposium identify several strategies that higher education leaders can employ.

First, institutions need to **take short-term actions with long-term vision**. In this time of recession, it's not possible to undertake every large-scale efficiency program the institution has in mind. In fact, even in good times, colleges and universities found it hard to budget for projects such as new cogeneration facilities or complete energy retrofits of aging buildings. (Thought Leaders participants note that if deferred maintenance was a problem when the economy was thriving, how would institutions find the means to fix it now?) The solution is to take the small steps that are possible in today's budget while keeping an eye on the big picture. That means the institution needs to develop long-term plans and come up with major goals, but it doesn't have to undertake all those goals at once. Simple strategies can have measurable gains that give the institution a sense of accomplishment and pave the way toward larger projects down the line.

Second, **higher education needs to develop incentives for increasing conservation**. Generally people want to be more energy efficient, and if they are given the right information and tools they will move toward conservation on their own. However, at some point all of the low-hanging fruit—all of the easy, painless steps—will have been taken, and it will get much harder to make further progress in conservation. This process is already playing out at some institutions; in the first year of Yale University's new conservation program, students cut energy use in residence halls by 10 percent, a significant achievement. The next year, however, energy consumption stayed about the same—students had done all the easy things to become more efficient, and the next steps, that would cut energy use by another 5 or 10 percent, would require uncomfortable sacrifices such as using fewer electronic devices or lowering the heat in their dorm rooms.

Certainly one response to this situation is enforcement; institutions can put energy policies into place that mandate lower energy use and crack down on violators. This has its place, but it can backfire and often ends up annoying and alienating those who would otherwise be supporters. Making conservation decisions for people also has its place; for example, a college or

Data Point: Top five steps to shrink the campus carbon footprint

Tips on achieving the most significant results from the NWF

The National Wildlife Federation has been working with students and faculty on greening the campus for decades. Based on their experience, they propose the following five steps to success:

1. **Convert to zero-carbon or lower-carbon energy sources** (2 to 70 percent savings). Switching to wind, solar, or geothermal energy can result in the greatest cuts to carbon dioxide emissions.
2. **Update efficiency of HVAC** (2 to 30 percent savings). Target the biggest users of energy first, like labs, swimming pools, and older dorms.
3. **Scale back heating, cooling, and lighting demand** (2 to 20 percent savings). Changing thermostat settings requires no upfront investment and can have a major payoff.
4. **Reduce plug loads** (2 to 20 percent). Electronics steadily drain energy from the grid. The best strategy combines behavioral and technological changes.
5. **Make wise campus planning decisions.** Comprehensive, campus-wide planning leads directly to improved stewardship of resources.

university might install low-flow shower heads and toilets in residence halls—although even this strategy can have unintended negative consequences, as when dorm residents in Yale protested loud and long when they disliked their new water-efficient showers, eventually forcing the university to raise the water pressure. However, Thought Leaders participants agree that the most successful energy conservation programs will provide incentives to improve efficiency. These incentives could operate on many levels, from entire divisions and departments down to individual students and faculty members.

Next, **institutions need to develop approaches that reduce risk**. Energy risk is a complex topic, and so are some of the strategies to manage it. Institutions can enter into agreements designed to hedge against risk such as swaps, caps, option pricing, and collars. Universities would be wise to seek out skilled, experienced experts to explore these financial mechanisms. However, these are not the only steps colleges and universities can take to limit their risk. Investment in alternative energy provides a hedge against fossil fuel prices, while actually generating power gives institutions control over their energy production.

Finally, **colleges and universities should diversify and leverage funding sources**. Creative thinking has led institutions to develop a wide range of funding mechanisms for energy management programs. Some create revolving loan funds for efficiency projects, others borrow against their endowments, and still others seek out grants from private, state, and federal sources. Student fees are becoming an increasingly powerful way of funding energy improvements; at several institutions,

Data Point: Achieving net-zero buildings on campus

Higher education association partners with the DOE

The U.S. Department of Energy (DOE) launched a major initiative in 2008 to advance the development and adoption of net-zero energy commercial buildings—buildings that would have a net-zero effect on the power grid by generating as much energy as they consume. Significant research will be required to meet the goal of marketable net-zero buildings by 2025, including research on challenges and solutions appropriate for different market sectors. DOE is therefore partnering with industry groups to develop sector-specific strategies.

The newly formed Higher Education Energy Alliance (HEEA) is DOE's partner for higher education and will lead the effort to develop net-zero buildings for colleges and universities. Along with other higher education associations, APPA will work to harness advanced technologies emerging from DOE and its national laboratories, create an information-sharing network to promote effective strategies, help shape future energy research, and serve as a unified industry voice on energy issues in higher education.

students have voted to increase fees to fund projects ranging from LEED-certified buildings to investment in wind farms.

The role of higher education. No matter how great the energy challenges confronting them, colleges and universities have a unique obligation to respond. Higher education plays numerous important roles in our society: educator, leader, innovator, creator. All of these roles will need to be applied to the challenges of global warming and energy uncertainty.

One specific area in which colleges and universities can play a part is in **energy research**. Fortunately, funding for such research seems to be on the rise; more than $327 million of the Obama administration stimulus funding went into research on projects including smart grid technology and integrated climate research. However, funding would have to jump even more to come close to the equivalent of late 1970s levels, a tough proposition for a down economy. More than likely, colleges and universities will have to continue patching together a wide range of funding sources for their energy research. Experts agree that no matter how it is funded, colleges and universities will be the source of the most innovative new energy technologies.

Colleges and universities can also provide a **forum for experimenting with different energy strategies and conservation programs** as well as for field tests for energy research. Where better to put new ideas into action than in the institutions where those ideas were developed? Higher education needs to embrace experimentation even in the face of risk and try out new ways to generate electricity, manage water, and control air. Colleges and universities also need to reach out into the community and **create and leverage partnerships** with alumni, civic leaders, utility companies, and other institutions. Institutions have enormous storehouses of intellectual capital to draw upon outside of the university's walls; it's time to tap that capital to come up with creative energy solutions.

Section III: Higher Education Facilities Leaders Respond

Thought Leaders symposium participants believe the leaders of college and university facilities department have much to contribute toward improving the sustainability of their campuses. In fact, **facilities departments must play a central role in green projects since the built environment generates up to 90 percent of an institution's carbon footprint**. Without facilities on board, institutions will only be nibbling away at the edges of their environmental impact. Of course, the greater the potential impact, the greater the investment required. Energy retrofits, HVAC upgrades, and LEED-certified new construction cost money. For facilities departments to obtain results, they need the backing of the institution's leadership, a long-term commitment to sustainability, and the resources to accomplish their plans.

Another contribution of facilities leaders toward campus sustainability is that they already understand energy and building issues and can and provide information, insight, and perspective to other campus leaders. Sustainability is a complex topic—it takes time and effort to get up to speed on topics like smart grids, RECs, and submetering, time most campus leaders can little spare. At the end of the day, it doesn't make sense for business officers or department heads to get involved in the intricacies of these issues when facilities leaders have already mastered them. Facilities leaders must communicate what they are doing, educate their colleagues on sustainability and energy impacts, and take the initiative to organize stakeholders campus-wide. At the same time, institutions need to turn to the expertise of their facilities professionals and call on them to take a leadership role in facing the challenges ahead.

Data Point: Smart grids

Improving energy transmission and distribution across the continent—and on campus

Most people pay little attention to the electrical grid, the system that transmits energy from power plants to cities and eventually to individual homes, until part of it crashes. But significant interest is currently focused on improving the grid to make it more reliable, secure, and efficient. The proposed "smart grid" would not only better withstand catastrophic failure, it would also provide new means of communication between utilities and consumers and increase the ability to predict and control load. The Department of Energy recently devoted $3.4 billion in research dollars to creating a new smart grid for the U.S.

Higher education institutions are leading the way to develop new smart grid technologies. For example, Washington State University, the University of Illinois, the University of California Davis, and Dartmouth College are working on the five-year, $18.8-million Trusted Cyber Infrastructure for the Power Grid project intended to create a secure, real-time communication infrastructure. Other research programs are focusing on distribution management, automatic restoration of services during power outages, substation automation, and monitoring and control systems.

Colleges and universities are also pursuing smart grid technology to improve their own energy systems. For example, Drexel University plans to install a smart grid on a portion of its 65-acre campus that will help the university manage its energy costs using a real-time pricing system. The system allows the institution to buy power at times of the day when demand is low and sell back excess power when it isn't needed. The system will also separate parts of the campus from the larger power grid, protecting it from cascade power outages. In addition, the Power Resources Department at Drexel's College of Engineering will use the smart grid as a working laboratory as part of its program to develop effective uses of solar and wind resources in an urban environment.

A third critical contribution of facilities leaders is that **they understand the campus as a whole**. This holistic perspective is critical to achieving sustainability. To date, many college and university green efforts have been fragmented by the institution's structure—the college of engineering starts a recycling program, the biology department works on submetering for its labs, the residence halls compete in conservation efforts. These types of programs are great, but they are inherently limited. Real change will come when recycling is promoted everywhere from cafeterias to construction sites, when every building on campus is metered, and when thermostats across campus are lowered to save electricity. An individual department can't make those kinds of changes—they aren't even accustomed to thinking campus-wide. Facilities managers, however, already see the campus as a whole; when they make decisions, they consider the implications campus-wide. Tapping that insight will help institutional leaders understand how to make the entire campus green.

Section IV: Top Ten Facilities Issues for Higher Education

How the top ten issues were identified. The premise of the 2009 Thought Leaders Symposium is that facilities leaders have much to contribute to the major challenges facing higher education. This year, as they wrestled with sustainability and energy issues in the context of the recession, their contribution matters more than ever.

Participants therefore followed the same procedure as in previous years and discussed the specific challenges facing educational facilities and facilities professionals, seeking to identify the most important challenges facilities leaders will face in the next couple of years. While these are not all specifically sustainability and energy challenges, they followed the in-depth discussion of green challenges and arise out of the context of those issues.

Ten issues were identified by symposium participants, along with critical questions. The questions are the heart of the exercise: They are intended to guide facilities managers and university leaders in their own discussions. A major goal of the Thought Leaders series is to help individual colleges and universities to assess where they stand and help them develop strategies for the future.

One critical point: readers of the previous Thought Leaders reports might notice some issues have been added to the list and others removed. This does not mean that issues not carried over from the previous years have gone away as priorities. Instead, the issues identified each year are those that arose in discussion as the most critical at this time.

1. Adjusting to the new sustainability reality.

The Issue: Given the great expectations placed on the higher education enterprise, higher education needs to adjust to the new reality of sustainability as a permanent way of doing business.

Strategies:

- Accept that a sustainability focus is not a temporary trend but a long-term shift in the culture.
- Use the campus as a proving ground for new sustainability and energy projects.
- Leverage sustainability efforts to promote and grow higher education as well as to fuel large-scale social change.

Higher education institutions need to understand and accept that the green campus is here to stay. This is not a phase that will eventually pass but rather a new way of thinking about all aspects of higher education. Fossil fuels are not suddenly going to become cheap and plentiful again; climate change is not going to miraculously fix itself. Instead, institutions must reshape themselves so that conserving electricity and water, using renewable energy, and stewarding natural resources are the norm. The first step, then, for campus leaders is to assess their assumptions. Is your department taking a long-term view of sustainability?

It would be a mistake, however, to view this long-term shift to sustainability as a burden. Innovative, leading institutions view sustainability as an opportunity. First, colleges and universities can take advantage of their history as society's innovators to conduct critical experiments in green energy and conservation. Sustainability technologies and techniques are so new that no one yet knows which will be the most effective; only years of exploration and testing will demonstrate the best practices. Already, some institutions are becoming living laboratories that combine research with campus operations. Facilities departments must reach out to the researchers on their campuses and explore ways to combine forces.

Another opportunity provided by a long-term sustainability focus is to advance the academy. Individual colleges and universities have already discovered the recruiting power of going green; green report cards are eagerly studied by potential students who want to attend a school that has a commitment to the environment that matches their own personal convictions. Facilities departments can use this to their advantage; green programs can gain support among campus leaders when those leaders understand their PR benefit.

On a larger scale, sustainability also has the potential to advance all of higher education in the U.S. and Canada. North America has led the world in science and technology for decades, but that leadership requires constant investment and attention. To remain in the forefront, we must always seek for new challenges to overcome, and there is no doubt that living in harmony with our environment is the fundamental challenge of the 21st century. At the same time, higher education can also promote large-scale social change by pioneering sustainability. Every year as our colleges and universities graduate a new class of leaders educated in sustainability, the culture shifts ever so slightly to a more sustainable point of view. Over time, that shift will gain momentum and society will take these attitudes as a given. Higher education has an important leadership role to play in our culture, a role that gives the day-to-day routine meaning and purpose.

Questions for institutional dialogue:

- How will the campus make the transition to a sustainable perspective?
- How can your institution serve as a test-bed for assessing approaches needed to advance sustainability on campus? For society?
- How does advancing sustainability stimulate the growth of the academy?
- How does advancing sustainability affect the development of non-economical values such as university service, curricula, public engagement, and public perception?
- How can campus sustainability initiatives fuel large-scale social change through student learning, research, and partnerships with the private sector and government?

2. Developing an institutional vision of sustainability.

The Issue: Colleges and universities need to develop a vision of sustainability that drives decision-making.

Strategies:

- Define what sustainability means for your campus.
- Set specific goals and establish metrics to measure progress.
- Make sure short-term actions support the long-term vision.

Data Point: Higher education and sustainability

The role of colleges and universities in making the world a greener place

"No institutions in modern society are better equipped to catalyze the necessary transition to a sustainable world than colleges and universities. They have access to the leaders of tomorrow and the leaders of today. What they do matters to the wider public."

—David W. Orr, professor and author, Oberlin College, from *The Last Refuge*

It is one thing to say that sustainability is the new reality, but what does sustainability mean? The answer is going to be slightly different for each institution depending on its size, location, structure, and academic goals. Colleges and universities need to decide how they define sustainability and what going green means for their students, faculty, and staff so they can focus their efforts. Rather than going off in a dozen different directions, the entire campus can be unified around one vision for sustainability. Refining this vision matters particularly to facilities leaders because they make small, short-term decisions every day that affect sustainability and energy. Without a clear, articulated vision, it's impossible to be sure that those decisions are taking the campus in the right direction.

The institution needs that vision translated into clear, defined goals. Not only will those goals drive actions, they will also create opportunities to celebrate successes as goals are achieved. Campuses need to know that they are making progress, not in a never-ending slog without any chance at victory. Breaking the vision down into goals also helps clarify what the institution needs to measure. The business-school adage that you can't manage what you can't measure is particularly true in the context of sustainability.

Part of the challenge of developing a vision is ensuring it remains a priority over time. The sustainability vision needs to be sustainable. Yet as campus leaders come and go, as news stories about the environment slip on and off the front page, as student interest waxes and wanes, it's easy for the institution to lose sight of that vision. For example, if the campus

president makes reducing the campus's carbon footprint a major priority and then that president leaves, will carbon remain important without his or her leadership? Institutions need to consider how to keep the sustainability vision fresh and relevant to the campus within the context of a consistent vision. In the same vein, institutions today are making environmental commitments such as the ACUPCC that require long-term investment and effort. How will the campus keep up that commitment when all those who originally signed have moved on or retired, particularly when the work gets hard and public attention has shifted?

The ultimate measure of the effectiveness of an institution's vision is whether or not it can be used to guide short-term decisions. In the midst of a recession, it's impossible for colleges and universities to undertake all of the sustainability initiatives that make up their long-term strategy. As long as the institution's vision can shape short-term choices that move the campus further along the path toward sustainability, the recession doesn't have to be a setback for green goals.

Questions for institutional dialogue:

- What does the institution want to achieve in terms of sustainability?
- How does the institution define sustainability? Has the institution articulated this definition into a vision for sustainability?
- What specific goals and milestones are necessary to achieve this vision?
- Is this vision integrated into all facets of the institution, even those areas sometimes left out of the sustainability discussion such as athletics, branch campuses, and university-owned lands?

Data Point: University visions and goals

Sample vision statements from various colleges and universities

Institution	Vision	Goal
Middlebury College (VT)	"Middlebury College is committed to environmental mindfulness and stewardship in all its activities. . . . All individuals in this academic community have personal responsibility for the way their actions affect the local and global environment."	Carbon neutrality by 2016
University of California, Santa Cruz	"UC Santa Cruz strives to integrate sustainability into every aspect of research, teaching, and public service. Sustainability is our way of thinking about everything we do . . . . Sustainable practices support ecological, human, and economic health and viability."	Reduce greenhouse gas emissions to 2000 level by 2014, to 1990 level by 2020, and to 80 percent below 1990 level by 2050.
Oberlin College (OH)	"The core mission of Oberlin College is the education of its students. One aspect of such education is the demonstration by its action of the College's concern for, and protection of, its physical environment. Oberlin College must be a responsible steward of the environment."	Climate neutrality by 2020
Yale University (CT)	"Yale University is committed to developing best practices that balance economic viability with ecosystem health and human health in its operational practices, the built environment and institutional decision making while contributing leading scholarship, research, and educational models to a global dialogue"	Carbon emissions 10 percent less than 1990 levels by 2020 (43 percent below 2005 levels)

- What do you need to measure to track your progress toward your vision? Do you need new metrics?
- Is the sustainability vision sustainable? Are there processes in place to ensure continuity of vision and continued adherence to commitments?
- How can you ensure short-term actions support the long-vision? (Consider efforts such as master-planning and budgeting.)

3. Creating a leadership role for facilities managers in addressing sustainability.

The Issue: Facilities managers need to take leadership roles in their institutions' sustainability efforts.

Strategies:
- Ensure that facilities managers have the education, skills, and leadership abilities to take their place among institutional decision-makers.
- Communicate the value of facilities leaders in the sustainability and energy management effort.
- Leverage existing facilities operations and programs to support sustainability.

A priority of APPA's Thought Leaders Series from the beginning has been to get facilities managers a seat the table so they can contribute their expertise to the overall goals of the institution. This priority is more important than ever as colleges and universities strive to confront energy and climate challenges. Other parts of this document have pointed out how critical is the built campus environment to the sustainability effort, accounting for up to 90 percent of an institution's greenhouse gas emissions. It only makes sense for the educational facilities professionals to take a critical leadership role in sustainability initiatives, yet many are still sidelined or hampered at their institutions.

How to resolve this challenge? First, facilities managers need to take the initiative. They need to seek out leadership opportunities, create a role for themselves, and prove their value to the institution. They also need to evaluate themselves and their team members to determine what crucial skills they are missing. Additional training or certification in some aspect of sustainability might increase credibility; an understanding of financial issues could help facilities managers speak the language of key business decision-makers; a crash course in public relations could enable a department to better present itself to the campus.

At the same time the facilities department builds it image, it can also start implementing sustainability initiatives. Yes, a bold, unified vision of sustainability created with the critical involvement of facilities managers is ideal, but if that's not the reality on an individual campus, there's no reason the facilities team can't start implementing sustainability measures on their own. Working within the existing program and budget, departments can take simple steps to increase energy efficiency and reduce environmental impacts. Promoting these steps helps position department leaders as experts and the department itself as energetic and proactive. Facilities leaders can then build partnerships across the campus with like-minded individuals and units and begin the process of greening the campus from the bottom-up.

Questions for institutional dialogue:
- Does facilities have a seat at the table when discussing critical institutional issues? When discussing sustainability and energy? What are the barriers to facilities getting to the table, and how can they be overcome?
- How can facilities managers better communicate their value and expertise?
- What is the perception of the facilities department on campus? Does that perception need to change to accommodate new and changing expectations and roles?
- Do facilities leaders need additional training or certification for themselves or their staff?
- Can existing facilities operations and programs be leveraged to support sustainability?
- How can facilities build alliances across the campus community to promote sustainability?

4. Confronting economic challenges.

The Issue: Colleges and universities must confront the current recession and maintain forward momentum despite economic restraints by shifting expections among stakeholders.

Strategies:

- Strive to set realistic expectations within the institution.
- Leverage sustainability to elevate its priority.
- Incorporate total cost of ownership into the decision-making process.
- Engage legislators in discussions about sustainability.

Participants at the Thought Leader symposium view the current economic situation as one of limitless demands placed on shrinking resources. The recession has had an effect on every college and university, and many are struggling with budget cuts and staff reductions. Yet the work of the institution must go on.

Everyone in the academy must adjust to the new economic reality, and that means shifting expectations. For years, students have come to expect ever-more luxurious dorms, dining halls, and recreation centers; alumni and sports fans have grown accustomed to high-end sports facilities; faculty have come to think the latest technology their due. The time has come to assess some of those expectations and evaluate which are unrealistic in times of economic hardship. Colleges and universities need to make sure that their budgets reflect their priorities.

This is as true in facilities as in any other area of university operations, particularly when sustainability is added to the mix. For example, renovations to older buildings and retrofits of water and energy systems have typically been low on the facilities to-do list, pushed aside in favor of new buildings, thus creating the dreaded deferred maintenance problem. But when examined in the context of sustainability, those older buildings might be responsible for a significant chunk of the institution's carbon footprint, while water and energy system upgrades could move the campus a long way toward achieving its sustainability goals.

Similarly, facilities managers need to emphasize the concept of total cost of ownership (TCO) and work to make it part of all facilities decision-making on campus. Facilities experts have long understood that the cost of new building doesn't end once construction is complete; smart decisions made during planning and construction can reap significant benefits over the years. TCO can become a harder sell during the hard times—it's difficult to argue for higher-priced construction methods, materials, and systems when all the attention is focused on the bottom line. That's why TCO needs to become part of the bottom line—the real bottom line, the one that the university will pay out over the years.

Finally, state colleges and universities continue to face the challenge of working with the legislators that hold the purse-strings. Thought Leaders participants call it the challenge of "accessing the pork belly." However, sustainability is often the last thing on the mind of state law-makers attempting to juggle a bewildering number of priorities. As a result, sometimes state funding is apportioned in ways that don't line up with the institution's values and vision. The only solution requires an investment of time and effort to engage legislators in meaningful dialogue about sustainability in the university system.

Data Point: Financing green improvements

Revolving loan funds provide a means to pay for sustainability improvements

The recession is wreaking havoc across college and university budgets, making it particularly difficult to pay for green campus improvements. One model, however, has proven successful as a funding mechanism for sustainability projects: revolving loan funds (RLFs).

RLFs are created by setting aside a sum of money generated from grants, donations, campus fundraising, and student fees. Members of the campus community can then submit proposals for sustainability projects that will produce savings in energy costs. The board grants loans to the most effective projects, providing the necessary upfront costs, and the savings generated are paid back into the fund until the project is fully paid for. This creates a revolving source of capital for green projects.

Several institutions have used RLFs with significant results. For example, Harvard University's Green Loan fund financed 147 projects between 2001 and 2007 that reduce emissions by 33,227 metric tons of CO2 and saved 15.5 million gallons of water. The average project return on investment was 26 percent. Today, numerous other colleges and universities are considering the potential of RLFs for their campuses.

Questions for institutional dialogue:

- How do we define institutional needs versus wants?
- Are the institution's needs prioritized so that they are in alignment with the institution's values and vision?
- What ways do we use to set expectations? Can we create more realistic expectations on campus?
- How do we market and leverage sustainability to elevate its priority?
- Is total cost of ownership part of the decision-making process for all facilities project? If not, why?
- How do we align state funding resources with the institution's values and vision?
- Do state authorities value sustainability? If not, how can we begin the process of engaging them on the topic?

5. Fixing broken budget models.

The Issue: Higher education finance and budgeting needs to be adjusted so that it values long-term investments and incorporates total cost of ownership.

Strategies:

- Evaluate the budget process at your institution to assess the unintended consequences of separate funds and budgets on facilities sustainability, maintenance, and renewal.
- Educate campus leaders on the concept of total cost of ownership and its implications for facilities in general and sustainability efforts in particular.
- Develop incentives to promote long-term thinking.

A daunting challenge facing colleges and universities is that the entire finance and budgeting model of higher education fails to encourage the sort of long-term, comprehensive thinking required to make sustainability succeed. In fact, in some circumstances higher education budgeting actually discourages sustainable building and efficient energy use on campus. For example, new construction is generally paid for with capital funds, while operations and maintenance are financed through general funds. There is no incentive for those managing the capital budget to design a highly efficient, sustainable building that will cost less to maintain over time; in fact, since high-efficiency buildings generally cost more up-front, capital fund managers have an incentive to buy the cheapest building systems and ignore how much they will cost over the long run. Similarly, individual buildings and departments have little incentive to improve their energy efficiency. They must pay for any efficiency upgrades upfront from their own budget, but any money they save is simply removed from their budget—they can't reinvest that money either in further efficiency improvements or in other department priorities.

The fundamental issue is that the higher education financing model does not incorporate the concept of total cost of ownership (TCO). TCO makes the point that buildings cost more than their upfront construction costs; their true cost includes a lifetime of operations and maintenance as well as eventual decommissioning and deconstruction. A TCO calculation can make previously difficult decisions straightforward—as well as turn some construction decisions on their heads. For example, a heating and cooling system that costs 10 percent upfront but that will cut energy costs by 35 percent a year is a no-brainer in terms of TCO. TCO has been a priority of green-minded architects and energy for years and is a central component of LEED certification, but nevertheless has not yet made it into the budgeting system at colleges and universities.

For sustainability to make an impact in higher education, campus leaders need to take a close look at their budget models and consider the unintended consequences of that model. Clearly, the entire system can't be scrapped, but simple, straightforward steps can be made that will provide incentives for long-term thinking and discourage short-term tunnel vision. Most importantly, university budgets need to stop considering operating, renewal, and long-term capital needs in isolation. Evaluating these needs as a whole will take the institution a long way toward a sustainable future.

Questions for institutional dialogue:

- How does the budget plan provide for integration of operating, renewal, and long-term capital needs?
- What is the commitment to sustainability and how is it integrated with budget planning?
- How can the budget plan incentivize support for sustainability strategies?
- How can capital renewal advance progress toward sustainability goals?
- What alternative financing mechanisms can be utilized to leverage progress on sustainability- and energy-related initiatives?

- Does the budget process allow response to energy volatility?
- Does the budget model allow for reinvestment from energy cost savings generated?
- How do you evaluate and select energy reinvestment opportunities?

6. Managing rising energy costs and energy volatility.

The Issue: Higher education institutions need to adapt to rising energy costs and develop strategies that reduce the risk of energy price volatility.

Strategies:

- Consider creative strategies to reduce risk and manage energy costs.
- Find ways to include the cost of carbon dioxide emissions in your campus growth and energy decisions.
- Stay current on legislative discussions about energy and carbon costs.

The sudden uptick in energy prices earlier this decade brought home an important lesson to colleges and universities: energy is no longer a stable commodity. Factors completely out of the control of any institution—far-away wars, natural disasters, and national policy decisions—can have dramatic impacts on the price of electricity. The one safe assumption is that energy prices will not return to the stable position they held for years. Institutions need to be prepared for a future in which energy becomes not just more expensive but unpredictably expensive.

That means institutions need to immediately start exploring options to reduce their risk. Strategies will range from simple to bewildering complex—from energy conservation to reduce exposure to elaborate financial hedges to protect the institution. Many institutions will want to work closely with local utilities; others will seek to generate their own energy, employing renewable sources, to cut their reliance on the national power grid. Energy solutions won't be cookie-cutter but will vary widely depending on the unique location and demands of each campus. What matters is that there is a plan.

Further, plans need to be based on the true price of energy, one that includes the cost of carbon dioxide emissions. Most scientists agree that greenhouse gases have a measurable effect on the environmental, and both researchers and policy-makers have argued that those who emit those gases should pay for that effect, either through a carbon tax or through a cap-and-trade system. However it is implemented, it is likely that many

Data Point: The cost of carbon

Counting the cost of greenhouse gases through the carbon tax and cap-and-trade

Requiring those who produce greenhouse gases to pay for them is a popular strategy among economists and environmentalists. They claim these systems would help mitigate climate change, reduce emissions, and promote non-carbon-producing green energy sources such as wind and solar.

Generally, two types of systems have been proposed. The first is the carbon tax, which would involve taxing the burning of fossil fuels according their use and in proportion to their carbon content. These taxes would have the effect of increasing the competitiveness of low-carbon technologies and renewable energy sources. A national carbon tax was first proposed in the U.S. in 1993, but it was soundly rejected then and is unlikely to gain any traction now. However, several states and municipalities in the U.S. and provinces in Canada have implemented or are considering implementing carbon taxes.

The second type of system is known as emissions trading or cap-and-trade. In this approach, a government body provides economic incentives for achieving reductions in the emission of pollutants. The government places a limit or cap on the amount of a pollutant that can be emitted; companies or other groups are required to hold allowances or credits that represent the right to emit a specific amount. Companies that need to increase their emissions allowance must buy credits, while those who pollute less can sell their credits for a profit. The overall effect is to reduce pollution and promote renewable energy. A carbon tax-and-trade bill was passed in June 2009 by the U.S. House of Representatives, although of this writing the Senate has not acted on the bill.

colleges and universities will have to start paying for their carbon in the future. Proactive institutions won't wait to start counting the cost of their carbon dioxide and measuring their reductions in greenhouse gases. At the same time, smart institutions will also stay on top of legislative debates about energy and carbon costs. Institutions should work with local and state governments to help them understand the impact of proposed plans on campus.

Questions for institutional dialogue:

- Do you have a plan in place to address energy volatility?
- Are you working with utility companies to manage energy prices?
- Can you diversify your energy sources to reduce risk?
- Does your master plan consider future energy availability? Does your plan include multiple energy sources?
- Are you incorporating the cost of carbon in your energy models?
- Do campus growth and energy decisions include a cost for carbon?
- Are you keeping current on legislative discussions about energy and carbon costs? How can you influence this legislation?

7. Engaging the campus to address energy challenges.

The Issue: Facilities can't fix energy challenges alone—the entire campus must be mobilized to conserve electricity and embrace green solutions.

Strategies:

- Leverage student and faculty advocacy.
- Make energy use personal.
- Implement energy conservation in all areas of the institution.
- Offer incentives for success.

The variety of environmental programs underway on college campuses today is simply bewildering—from organic gardens to bicycle rentals. Energy issues are also on the agenda, but so complex and overwhelming are energy challenges that they often haven't received as much attention as other green initiatives. Yet energy conservation and green energy production are two of the biggest hurdles to a greener campus. Certainly facilities departments have a critical role to play in overcome that hurdle by undertaking technical work such as smart grid development, for example. But ultimately it will take the commitment of the entire campus to reduce the carbon footprint.

Facilities managers can start by harnessing the enthusiasm and commitment of student and faculty environmental advocates. They can reach out to these groups and offer their expertise to build understanding of the issues. They can partner with dorm representatives or building occupants to develop energy management plans. They can even team up with campus groups to create conservation competitions, which have been shown to have not just short-term results but also promote long-term changes in behavior. These steps can help build consensus on campus on the importance of energy conservation and build a base of support.

Beyond a core group of supporters, facilities groups can work to bring the conservation message to the campus by finding ways to make energy use real and personal. Most people have little idea how much energy they use throughout the day. Dorm residents don't get electric bills, nor do deans of colleges. Submetering of different campus buildings, floors, and even individual hallways can help inform individuals of how they're doing energy-wise and make an otherwise remote problem more personal. Some campuses might even make the move to charge departments for their energy use rather than supply it out of the institution's operating budget—and when energy becomes a line-item on your budget, it's personal.

Facilities staffs also need to strive to implement energy conservation on all segments of the campus. Of course, this won't happen all at once. The process needs to be systematic, with step-by-step assessment of energy usage and implementation of conservation strategies. Clearly, it will be easier to go green on some areas of the campus than others. This report has documented some of the difficulties involved in implementing conservation in athletic programs and research labs. Widespread support will help, as will demonstrating efficiency rewards.

Another key to achieving conservation is offering incentives. Generally, campuses respond better to carrots than sticks—incentives achieve more than enforcement. Institutions need to develop incentive programs for their

different campus constituents that will help move the entire organization toward energy efficiency. The best incentives are targeted, related to that constituency's priorities and stake in the campus, and aligned with the vision and values of the institution. Establishing incentives also means implementing metrics to measure progress and determining what it means to succeed.

Questions for institutional dialogue:

- Are student and faculty groups involved in energy issues? Can you educate groups to raise the priority of the topic on campus? Can you leverage the efforts of champions for your cause?
- What efforts are underway to educate the wider campus population on energy issues and promote conservation? What programs should you put in place?
- Who within the facilities department is responsible for coordinating with student and faculty groups and organizing informational campaigns? Is this a defined task?
- Can you find ways to make energy personal even though campus users typically don't pay for it?
- How does the entire campus move toward conservation? What programs/buildings/groups have so far been able to ignore the message? What will it take to reach them?
- What incentives toward conservation are in place today? What disincentives?
- What would be effective incentives for different groups on your campus? Can you tie incentives to a group's identity or priorities? Can all incentives be aligned with the institution's vision and values?
- How do you measure progress and define success?

8. Managing space

The Issue: Colleges and universities need to better manage their space to make more responsible and energy-conscious use of their built environment.

Strategies:

- Rethink space management in the light of sustainability.
- Create clear standards and policies governing space.
- Create metrics to measure space utilization.

Data Point: Creative conservation

Institutions have found simple, smart ways to reduce energy consumption

By replacing incandescent lamp bulbs on desks with compact fluorescents, **The University of Tennessee** saved $4190 and 60 tons of CO2 in a single semester.

Vending machines, ubiquitous on campuses, became a target of **Tufts University**, which installed "vending misers" that turn off the machines when not in use while keeping beverages cold. The plan cut electricity consumption on the machines in half, saving an estimated $17,000 and 100 tons of CO2 annually.

Pomona College is working to cut energy consumption on computers by installing the EZ Save software by Energy Star, available free online, which powers down computers while not in use. A 2007 study estimated that if all 800 school-owned machines used the software, the college would save more than $53,000 and 350 tons of CO2 annually.

Space management has long been a hot topic on college campuses—nothing can inflame passions like a reallocated office or shifted classroom. The worst territorial instincts of human beings take over—departments and faculty members see certain spaces as theirs and will go to almost any length to protect them.

Sustainability puts space management in a whole new perspective. Underutilized space—such as an empty classroom—wastes energy. Environmental experts walking through empty classroom hallways on Friday afternoons might well fume at the light, air, and water going to waste because neither faculty nor students like Friday 3:30 lectures. And really, does it make sense to air-condition an entire campus an entire summer just for the office staff and a few faculty members? The rhythms of life on a college or university campus are rooted deep in history and tradition, and not all of them make sense in the 21st century when energy conservation is a priority.

Some space management issues will be beyond immediate resolution, but even simple steps to improve

space utilization can have big rewards. The first step is to start thinking about space management as a sustainability issue. These two issues have generally been handled completely independently, so it will take time and education for campus constituents to understand their relationship. However, if this point-of-view is promoted throughout the institution, it can start to become an acceptable rationale for new decisions in space management.

In fact, institutions ultimately need to tie their space management process to their campus sustainability goals. Reducing the campus's carbon footprint means making better use of the space the campus already has. Colleges and universities need to examine their assumptions about the need for new space. LEED-certified buildings are remarkable models of efficiency and sustainability, but they do nothing to stop the greenhouse emissions and waste generated by existing structures. If space is at a premium, perhaps the institution could make better use of its resources by renovating and reconfiguring an older building than building a new one. The greenest structure, after all, is the one that is never built.

Institutions should also make sure they have in place clear standard and policies governing space. Without defined rules, the turf battles can get out of hand; making the rules fair and straightforward creates an even

Data Point: Managing space

A new attitude toward space management is changing utilization patterns on campus

An old saying on colleges brings home the importance of space: "Academics will fight over money and kill over space." However, that attitude is starting to change under pressure from institutions determined to control costs. Unused space adds up—on a five-million-square foot campus, one percent of underutilized lab and office space equals about $3.7 million in wasted construction costs, not to mention the lifetime costs of maintenance and utilities for that space.

Many institutions now track the utilization of their space and require departments to justify the use—or non-use—of their classrooms and labs. For example, the University of Michigan carefully tracks classroom utilization and requires departments to provide detailed information about their needs before they can request more space. When one department came asking for more classrooms, according to Phil Hanlon, Michigan vice provost for academic and budgetary affairs, Hanlon's department was able to show them they were only use their classrooms about 20 percent of the time.

Such information can lead administrators to push for schedule changes to maximize space. At Kean University in New Jersey, only 11 percent of classrooms were used on Friday afternoons and only 8 percent on Saturdays. Although both faculty and students protested, Kean emphasized the cost of underutilization: to meet its operations budget under the current schedule, the school would have to bump tuition by almost 20 percent. So classes started up on Friday afternoons and Saturdays, with utilization now at 50 and 16 percent respectively. The university has been able to accommodate more than 700 additional students without any new construction and with a tuition increase of less than 5 percent. To soften the blow, the university offers course discounts of up to 20 percent for students who enroll in the Friday and Saturday classes.

Finally, some institutions are using space utilization information to start limiting new construction. Michigan, for example, added new buildings at a rate of about 2 percent a year from 1997 to 2007. However, when the recession eliminated $100 million in state appropriations, the university put on the brakes, slowing growth to half a percent in the last two years; each 1-percent reduction in the growth of square footage equals a savings of $4 million in operations costs. Administrators at the University of Minnesota have proposed an even more drastic measure, a no-net-growth policy: If the university builds something new, something else has to come down. The plan has yet to be implemented and may never gain traction, but it points the way to a more conservative attitude toward space on campus.

playing ground and reduces tensions. Institutions with existing space management policies should reevaluate their guidelines in the light of sustainability to look for opportunities to reduce inefficiencies.

Finally, institutions should look for ways to measure and evaluate not only the quality of their spaces but also their utilization. Facilities departments should be able to track utilization throughout the day and across the year. Concrete data will help identify over-burdened spaces as well as underused ones; in time, facilities staff can outline a detailed model of space utilization on campus and make recommendations on how to better manage it. Furthermore, when space utilization information is combined with submetering, facilities managers can understand the relationship between space use and energy consumption, powerful information for moving the campus toward greater energy efficiency.

Questions for institutional dialogue:

- Is space management considered an issue of sustainability? If not, can the facilities department make that case to campus constituents? How?
- Who controls space management at your institution? Is this process centralized? Who "owns" different parts of the campus?
- Are policies and procedures in place for managing space? Do these policies control all space or just some of it? Could they be generalized more widely across the campus?
- Have space management policies—including decisions about new building construction—been tied to campus sustainability goals? Before new construction goes forward, are existing buildings evaluated to see how they could be renovated to meet the expressed need?
- How is space utilization measured on campus? Can the institution track how spaces are used through the day and throughout the year?
- Can information on space utilization be tied to submetering information to better understand the relationship between the two?

9. Prioritizing renewal needs.

The Issue: Colleges and universities should consider their backlog of renewal and renovation projects in the light of sustainability and increase the priority for the upgrade of inefficient structures.

Strategies:

- Use sustainability to advocate for renewal of outdated buildings.
- Include sustainability as a factor in facility assessments and put priority on structures that are getting in the way of achieving the institution's sustainability goals.
- Develop criteria to determine which buildings aren't worth saving.

Deferred capital renewal, the problem of delayed maintenance and improvements to existing campus buildings, has posed a challenge to Thought Leaders symposium participants from the very first year. On campuses across North America, new highly efficient buildings—many even LEED-certified—stand next to inefficient, poorly maintained structures because the facilities department lacks the budget to retrofit them.

However, sustainability and energy issues put a new spin on the challenge of deferred capital renewal. Often, the buildings most in need of renewal are also the most environmentally challenged. Older buildings may have outdated HVAC systems that keep buildings too hot or too cold or distribute air inefficiently; their old-fashioned window units may make temperature control even more difficult, while their older lighting systems create heat and waste electricity. Deferred capital renewal becomes a new kind of challenge when the justification for work is cutting the institution's carbon footprint and electric bill. Facilities professionals need to, in effect, play the sustainability card to increase the priority of deferred capital renewal on campus. They also need to seek out additional funds for building upgrades from sustainability sources.

Many institutions already have in place a system for assessing the condition of different structures and prioritizing their renewal; those who haven't yet taken this step should move ahead. Even existing facilities assessment systems may need to be reconfigured in the context of sustainability. Facilities professionals need to ensure that they are keeping the right metrics so that they have the necessary data. For example, figures on water and energy use may not be available for older buildings, but data on the inefficiencies of these systems could up the importance of these buildings from a sustainability point-of-view.

Finally, institutions need to develop clear guidelines to determine when a building no longer serves a purpose or can't be renovated within a reasonable budget. Buildings on college campuses tend to become permanent institutions, never destroyed no matter how outdated and ineffective they have become. Certainly, historic preservation of important buildings has its place, but not every building qualifies for preservation. Buildings have life cycles, and that life cycle includes eventual decommissioning and demolition. Yet many institutions lack the criteria to determine when it's time to let go and move on. The previous top ten discussion made the point that the greenest building is the one that's never built, but that doesn't mean colleges and universities should stop building—only that they should evaluate both building and demolition decisions with solid information and a clear focus on their goals, including sustainability.

Questions for institutional dialogue:

- Is building maintenance and renewal considered a sustainability issue? If not, how can the facilities department raise the issue of deferred capital renewal in the context of sustainability?
- Can energy and sustainability concerns give new impetus to maintenance and upgrade projects? Are new or different sources of funding available to complete these projects?
- Does the institution have a system in place to assess the condition of buildings and rank renewal projects? If not, can one be put in place? If yes, does the system track sustainability issues and include them in the ranking process?
- Does the institution need to track new or different metrics on existing buildings to better make the case for sustainability-driven renewal?
- Is a process in place to determine when a building has outlived its useful life?

10. Meeting the challenges of workforce development.

The Issue: Facilities departments need to confront workforce development issues to be prepared for these challenges.

Data Point: Renewable energy use on campus

Higher education leaders poised to embrace green energy

There is great leadership potential for a paradigm shift regarding energy use in our higher education institutions. Presidents, trustees, and financial officers will back it because they realize the strategic and risk management value of renewable energy, as well as the financial benefits. Facilities directors will back it if they can see how it improves their energy efficiency, reduces operating costs, and leads to better buildings. Faculty will support it based on insights from their disciplines and across disciplines; students will support it when their teachers and mentors help put together an encouraging picture of a future based on a different paradigm.

– Andrea Putman and Michael Philips, *The Business Case for Renewable Energy: A Guide for Colleges and Universities*, published by APPA, NACUBO (National Association of College and University Business Officers), and SCUP (Society for College and University Planning), 2006.

Strategies:

- Assess the impact of the recession on the facilities workforce.
- Help current staff adjust to change.
- Develop strategies to bring new skills into the organization.
- Create a knowledge transfer system so the expertise of retiring workers is preserved.

Workforce challenges may seem far removed from the issues of energy and sustainability, but in fact they will play a major role in how sustainability initiatives are implemented on college campuses. The staff of facilities departments will do the heavy lifting to make sustainability a reality, and it's up to facilities managers to ensure they have the right mix of people and skills to get the job done.

An immediate challenge for facilities managers is the recession. Many institutions have cut positions or put in place hiring freezes. This can seriously limit the

operations of the department. Such policies also make it difficult to introduce new skills and abilities into the group, skills that might be important in implementing sustainability on campus. Another implication of the recession is delayed retirement by employees seeking to remain in their positions until economic conditions improve. Delayed retirements can be an advantage if you couldn't fill the vacant position because of a hiring freeze, but if older employees have limited skill sets or abilities, these holdovers put constraints on the potential of the department. Facilities managers should evaluate the implications of the recession on their workforce and strategize to meet any predicted challenges. What options are available in this time of economic hardship?

The recession combined with the new emphasis on sustainability and energy has placed significant stress on employees, many of whom are being asked to undertake new projects and quickly master new skills. Sensitive, thoughtful management will be needed to ease the concerns of facilities staff and help them adjust to the new environment. Make sure employees have opportunities to express their concerns and can get the extra help they need to handle the transition. Reach out to human resources staff if necessary for guidance and assistance.

Facilities professionals also need to be aggressive about updating the skill sets of their staff. That might mean training for existing team members. Remember training can range from highly formal to informal. Facilities managers can seek out professional training and accreditation programs for their employees, or even turn to their own institution for advanced education. At the other end of the scale, brown-bag lunch sessions can be conducted by members of the facilities team for their peers and still convey valuable information. This whitepaper could even be a source of series of lunch sessions designed to inform employees on the broader issues of sustainability in higher education.

Finally, facilities managers need to appreciate the depth of knowledge possessed by their older workers and make sure a system is in place to retain that knowledge with staff retire. The entire building industry has an aging workforce, colleges and universities not excepted, and when that workforce leaves, they often take critical information about campus buildings and systems with them. Institutions need to put in place a formalized system to assess institutional knowledge, capture and communicate that information, and reward transfer.

Questions for institutional dialogue:

- Do you understand the current and potential impacts of the recession on staffing decisions?
- How well is your staff adapting to changes in their jobs and their work environment? Are employees embracing or resisting change? If there is resistance, how can you work to overcome it? Can the campus HR department offer guidance or help?
- What critical skills are your staff missing that would allow them to better address sustainability and energy issues? How can you fill that gap? What educational and training opportunities are available to you through industry associations? Can you leverage the expertise within your organization to provide the necessary training? What mix of formal and informal training would best suit your needs?
- How effective is your institution's succession plan? Is there a system in place for assessing an employee's institutional knowledge and then capturing and communicating that information? Are incentives in place to promote knowledge transfer?

Section V: Conclusion

The intensity and urgency felt during the 2009 Thought Leaders Symposium hasn't diminished in the following months. While the economic recession seems to be lessening, the recovery is slow and halting, and prosperous days seem far away. Meanwhile, uncertainty about climate change continues. In September 2009, the U.S. Environmental Protection Agency issued its final rule on greenhouse gas emission monitoring and reporting. The U.N. sponsored Climate Change Conference in Copenhagen in December 2009 failed to result in a legally binding agreement on reducing greenhouse gas emissions, despite recognizing that climate change is one of the greatest challenges to our world and urging action to prevent global temperature rise. At the same time, many colleges and universities make strides toward a net-zero emissions campus; for example, 680 institutions as of this writing have signed the American Colleges and Universities Presidents Climate Commitment, from Adams State College in Colorado to Yeshiva University in New York. And many more institutions have developed sustainability goals and climate action plans without having signed the ACUPCC.

Campus leaders need to confront the challenges of sustainability and energy use head-on. Tools such as the annual Thought Leaders Symposium and this whitepaper help these leaders understand these challenges, develop smart strategies to address them, and implement solutions to meet their unique needs. However, the Thought Leaders Series seeks to do more than simply provide information—its goal is to promote dialogue. Conversations about sustainability and energy need to be ongoing within facilities departments, across campus groups, between facilities staff and senior campus leadership, and among the community. Campus leaders are encouraged to use this document as a starting point for those conversations—let it spark debate, challenge beliefs, confront conventions.

And then let us know what you've learned. Share with us where the dialogue has led you. What resources do you need to go forward? How can we help?

We look forward to hearing your response.

Appendix A: References and Resources

Section II: Critical Issues Facing Higher Education

Environmental sustainability initiatives on college and university campuses

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