



# The Economy's Influence on Environmental Sustainability and Energy

*Including the Top Ten Facilities Issues*

APPA THOUGHT LEADERS SERIES 2009

## Part 2

### 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.

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.

### 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.

## Section IV: Top Ten Facilities Issues for Higher Education

**H**ow 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 at 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 its 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 expectations 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 CO<sub>2</sub> 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 environment, 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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.