The Role of IT in Campus Sustainability Efforts

An EDUCAUSE White Paper

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## Table of Contents

Abstract .........................................................................................................................................3
Contributors..................................................................................................................................3
Introduction..................................................................................................................................5
Definitions ....................................................................................................................................7
Greening the Higher Education Agenda .......................................................................................8
  The Hurdles to Overcome ............................................................................................................9
  Forces for Change..........................................................................................................................9
The Role of IT in Campus Sustainability .......................................................................................10
  Reducing Campus Waste .............................................................................................................11
  Reducing Staff Travel ..................................................................................................................11
  Eliminating Commuter Traffic .....................................................................................................11
  Offering Tools for Assessment ....................................................................................................11
  Offering Tools for Information Dissemination ...........................................................................12
Green IT as a Strategy ..................................................................................................................12
  Server Consolidation ..................................................................................................................12
  Data Center Air Handling ...........................................................................................................12
  Virtualization ..............................................................................................................................13
  Power Management Schemes ....................................................................................................13
  Equipment Replacement Cycles ...............................................................................................13
Abstract
As the impact of worldwide carbon emissions comes into sharper focus, college and university sustainability efforts are increasingly turning green, focusing on ways to use resources more efficiently, consume less, and reduce campus carbon footprints. Yet, despite the direct impact of IT on institutional carbon levels and the potential for new technologies to reduce inefficiencies, campus IT is not always brought to the meeting table. In November, campus leaders in IT and facilities gathered in Adelphi, Maryland, at the University of Maryland, University College, for a two-day EDUCAUSE Summit on IT Greening and Sustainability to begin building connections between campus IT and wider sustainability efforts. This white paper captures key findings from the two days of brainstorming, discussion, and resource sharing and outlines a higher education agenda for moving forward.

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Introduction

In 2007, the United Nations Intergovernmental Panel on Climate Change (IPCC) painted a grim and unequivocal portrait of a planet in peril. *Climate Change 2007*, the IPCC’s assessment of climate change since 1990, drew upon the expertise of more than 600 leading scientists and researchers to scrutinize the impact of human activity on the world’s atmosphere. Their sobering assessment—that the evidence for global warming is “unequivocal” and its cause “very likely” human related—prompted U.N. Secretary General Ban Ki-moon to call climate change “the defining challenge of our age.”

At nearly the same moment that the IPCC’s report was grabbing headlines, higher education was inking its first major commitment to the challenge, drafting the American College & University Presidents Climate Commitment in January 2007. The document, signed by more than 600 presidents and chancellors at the time of this writing, recognizes both the scientific certainty of global warming and the overwhelming responsibility of academic institutions to chart a cleaner, greener path for the planet. Specifically, the commitment calls on colleges and universities to model ways to minimize global warming emissions while arming their graduates with the knowledge and creativity to achieve climate neutrality.¹

Outside the president’s office and stirred by rising gas prices, the instability of non-domestic energy sources, and a growing resolve among institutions to accept the world’s “defining challenge” as its own, campus sustainability has enjoyed a growing share of the limelight in recent years. Since January 2007, the Sustainable Endowments Institute has delivered the “College Sustainability Report Card,” an annual assessment that looks at sustainability efforts at 300 colleges and universities. The 2009 report found:

- About a third of colleges and universities received an “A” for food and recycling, with a substantial 70 percent of schools devoting at least a portion of their food budget to local farms and producers.
- Fifty-six percent of campuses reported that they have full-time staff dedicated to sustainability.
- One in three institutions have signed the Presidents Climate Commitment, and almost half have made a commitment to carbon reduction. Thirty-seven percent have already begun purchasing some form of renewable energy; another 34 percent have solar or wind production facilities on campus.
- Sixty-one percent of colleges and universities have at least one building that has earned LEED certification,² while three in five schools are pursuing green building projects.
- Institutions are also reducing campus transportation or traveling smarter. About two-thirds of schools have hybrid or electric vehicles in their fleets, while a little more than a third offer a carpooling service.³
Green is increasingly “cool” on campus. In its annual review of campus sustainability efforts, the Association for the Advancement of Sustainability in Higher Education (AASHE) noted that several campuses have woven environmental texts into required reading for campus freshmen, while others have sponsored events or weeklong activities that focus on energy consumption and sustainability.\(^4\) *The Princeton Review*—which added “green” ratings to its annual rankings of colleges and universities—noted that 63 percent of students surveyed for its annual “College Hopes and Worries Survey” said they would value having information about their college’s commitment to the environment. Just under a quarter of those respondents said the information would “strongly” or “very much” impact their decision to apply to or attend the institution.\(^5\)

Yet, despite a near explosion of interest in environmentalism and sustainability at the nation’s colleges and universities, there is one place frequently missing at the discussion table: IT. The Presidents Climate Commitment, for example, makes no mention of server consolidation or data center virtualization in its strategies for achieving carbon neutrality. The Sustainability Tracking, Assessment, and Ratings System (STARS) currently being piloted by the AASHE lacks any substantial IT component for campuses to self-assess their progress toward campus sustainability.

Across the technology industry, IT departments have shown a growing understanding of the role that their enterprise plays in the larger nationwide dialogue around climate change and environmental impact. More than half of the respondents to a *CIO Magazine* survey about green IT reported that their organizations have stated environmental sustainability goals. Thirty-eight percent said going green was just the right thing to do, while 37 percent said sustainability efforts also help them cut operational costs.\(^6\)

There has also been a greater awareness of technology’s role in global carbon emissions. “An Inefficient Truth,” a research report released by Global Action Plan, suggests that the global IT industry produces enough carbon emissions to rival the carbon output of the aviation industry. Worldwide emissions from the energy consumed by IT are also growing at an alarming rate, doubling about every four years.\(^7\) At our nation’s colleges and universities, cyberinfrastructure and IT can be major drivers in carbon emissions.

The larger campus dialogue around sustainability, however, often turns to transportation, resource management, dining, curricular engagement, and alternative energy, with less emphasis on the part that IT might play in both facilitating a greener campus and engineering solutions for more efficient energy consumption. Only recently have campuses begun to utter the phrase “green IT,” and while some have embraced the idea, most have not looked past simple efforts aimed at energy reduction to truly understand the transformative role that green IT might play across campus and in the larger quest to shrink our carbon footprints.

That missing link—between widespread campus sustainability efforts and IT—propelled campus leaders in IT, sustainability, facilities, business, libraries, and other roles, along with other organizations, to sit down together at the EDUCAUSE Summit on IT Greening and Sustainability, held November 13–14 in Adelphi,
Maryland, at the University of Maryland, University College. For two days, attendees shared personal experiences and strategized solutions to help enhance the growing body of knowledge on how IT can effectively contribute to greening and sustainability efforts on campuses. Due to the diversity of attendees—from both IT and non-IT roles—the discussion began with overall higher education sustainability concerns and then progressed to the role of IT in addressing these concerns. For some, who came to the table with little experience in IT, it was a two-day crash-course in green IT. For others, it was a stark wake-up call to the reality of the environmental challenges before us and the role that IT plays in exacerbating carbon emissions. But for all, it was a unique opportunity to begin building connections between what may have been previously disparate groups on campus.

Bill St. Arnaud, chief research officer for CANARIE, Canada’s advanced Internet development organization, set the stage by painting a stark picture of worldwide carbon emissions and challenging attendees to consider how universities can play a leadership role in helping reduce global warming and build a zero-carbon economy. Summit participants concluded the event by outlining a green agenda for IT in higher education that focuses both on the role that IT might play across the institution and the responsibility that IT departments have to reduce their own environmental impact. Across the board, attendees agreed that IT is a critical yet often neglected part of the dialogue surrounding campus sustainability. Through this white paper and future events and publications, they hope to create a greater voice for campus IT in the conversation.

Definitions

In recent years, as government agencies and nonprofit groups have sounded alarm bells over the threat of global climate change, popular culture has undergone something of a “greenwashing.” Phrases like, “environmentally friendly,” “organic,” “clean,” and “natural,” have permeated store shelves and television commercials. From industries touting “clean” fuel to manufacturers boast ing “energy efficient” devices, our green vernacular continues to grow, often diluting the significance of genuinely environmental efforts and making it difficult to sift through the imposters. It’s easy to disregard “green IT” as an attempt to greenwash the technology industry. For this reason, it may be important to define a stricter definition of what it means to be green in today’s campus IT departments. Are we sufficiently green, for instance, if we merely turn off desktop monitors for an hour each evening to conserve energy? Is it enough to simply institute double-sided printing?

For the purposes of this paper, we define green IT as those strategic IT efforts linked specifically to reducing carbon emissions, from consolidating campus servers and data centers to exploring virtualization tools, an effort one attendee dubbed as “lean and green IT” to underscore its potential cost-saving benefits alongside its smaller carbon footprint. This approach is purposefully forward-looking, pushing past the common definition of green as simply an effort to reduce waste or limit consumption, adopting instead a vision for green IT that is focused on specific and far-reaching efforts to curtail the environmental impact of campus computing, data processing, and storage.
At our nation’s colleges and universities, green IT is just one facet of a larger push for campus sustainability. Sustainability, as defined by the United Nations World Commission on Environment and Development, is “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” Beneath its umbrella, one might expect to find policies aimed at promoting better stewardship of the economy or efforts to protect and restore the environment while enhancing the well-being of society. Perhaps as a reflection of the sheer breadth of the term, a single campus sustainability office might have a role in projects to curb water consumption, promote green building, reduce cars on campus, oversee university spending, and promote a more open and ethical society. Sustainability is not merely about cutting consumption, therefore, but creating a future for the planet that’s prosperous and equitable.

**Greening the Higher Education Agenda**

If the mere definition of sustainability is so broad and far reaching, how can a single campus tunnel through the noise to create a comprehensive sustainability agenda that is focused on real and emerging challenges? How can a single sustainability officer decide which efforts will be valuable while discarding those that may be merely greenwashing?

Attendees at the EDUCAUSE summit turned to those questions at the start of the event, taking a broad approach to the sustainability questions that cut across campus. They began by scribing across their whiteboards and wiki pages a list of institutional priorities that campuses need to address:

- **Curbing Transportation**: Institutional efforts to reduce the number of cars on campus through rideshare programs, public transportation, and distance education, while practicing more environmentally friendly travel policies, such as purchasing carbon offsets, limiting travel for professional development, or encouraging virtual conferences, and meetings.

- **Assessing and Reducing IT Emissions**: Creating a campus baseline of carbon emissions to get a clearer picture of the types and quantities of greenhouse gases the institution is producing across the board and where the major culprits may reside; from that report, taking steps to reduce IT emissions, such as server consolidation, virtualization, and desktop power management.

- **Building Awareness**: Cultivating a campus culture that rewards sustainability efforts and promotes environmentally conscious activities—efforts might include better educating students, faculty, and staff about the impact of their daily activities; providing incentives for “doing the right thing”; and offering real strategies to help individuals reduce their own consumption.

- **Purchasing Power**: Weaving sustainability into campus purchasing agreements to encourage purchasing energy-efficient equipment.

- **Reducing Consumption**: Implementing campus-wide policies that cut down on the amount of solid waste generated by students, faculty, and staff, including the use of double-sided printing and e-books to reduce the amount of printed...
The Role of IT in Sustainability

paper on campus, expanding university-wide recycling programs, and encouraging campus dining units to explore compost initiatives

- **Building Smarter**: Requiring current and ongoing building projects to meet the minimum requirements for LEED certification while investigating areas where recycled materials and fewer materials might be used for facilities, dining, or student services

While attendees agreed that these categories should be campus priorities for the years ahead, they also articulated a nagging feeling that these priorities might not be shared across the institution. As one participant noted at the end of the first day, “This has to be a collegial effort. It’s no one’s job yet. I don’t think [higher education is] wrestling with it deep enough. We’re not feeling it deep enough.”

**The Hurdles to Overcome**

Not surprisingly, a lack of campus buy-in dominated attendees’ list of forces that work against campus sustainability efforts. They noted that it can be difficult to move environmental concerns to the top of the president’s agenda, often already cluttered with funding demands and campus policy initiatives. Beyond the central campus leadership, engaging the community to be active partners in a carbon-emissions agenda can be difficult without concrete correlations between the individual actions of constituents and the wider climate crisis. Despite a growing awareness in the public arena of the threat of climate change, many university students, staff, and faculty often see carbon emissions, in particular, as something beyond their control, making them feel immune to responsibility and resistant to changes that do not offer a clear and tangible benefit to their daily lives.

A lack of institutional commitment can undermine efforts to secure necessary funding and staffing, making it difficult to pursue a bold sustainability agenda. The sheer weight of the problem of climate change can be more daunting than inspiring, leading campus departments to believe the scale of the problem is too much for any single campus to influence or that solutions will be too costly or too difficult to engineer, particularly in older buildings or existing structures. The potential cost of a greener campus may be undermined by daily headlines about the growing global financial crisis, leading to the possibility that financial woes could supplant climate concerns on the university agenda.

**Forces for Change**

Despite those hurdles, attendees also agreed that a “green fever” sweeping the news and the national imagination may present a unique opportunity to leverage community enthusiasm into individual action. If institutions can capture student interest and translate it into student activism, students might take ownership of campus-wide initiatives and behavior-driven approaches. Perhaps as an indication of the rising “cool” factor of green thinking on campus, students at 21 colleges and universities voted to implement green fees in 2007. The fees—which ranged from $2 to $45 per semester—have been used to purchase renewable energy credits and install renewable energy technologies.
Students have also led campus-wide resource reduction efforts. During a “Campus Wars” competition, 14 colleges and universities in Minnesota vied to see which could achieve the greatest percentage reduction in campus energy use. Meanwhile, students at North Carolina State University and the University of North Carolina at Chapel Hill pitted their water meters against one other to see which campus could conserve more water during a major drought in the region. Students at California State University, Chico, adjusted thermostats on campus air conditioners by three degrees to cut energy costs throughout the year.

**IT at the Table**

This growing green fervor coincides with a wave of technological advances that may bolster institutional sustainability efforts. Reducing the number of cars on campus, for instance, may require the use of virtual classrooms and e-learning strategies that supplement physical classrooms with virtual courses. Wider access to broadband and web-conferencing tools may make it more attractive for employees to telecommute from home or participate in professional development activities from their own desks. Collaboration tools like Google Docs or SharePoint may reduce the amount of printed paper that passes between colleagues or gets shuffled between departments. IT departments themselves can take advantage of server virtualization to curb computing costs.

With these technologies as examples, campus IT can consider its place in the wider movement for a greener campus in different ways—as a consumer, a facilitator of change, a contributor to greater understanding, and a supporter of research. IT is a conspicuous consumer of energy, but there is an opportunity to present IT as part of the solution, not just part of the problem—to point out the ways that new technologies can aid in research (through simulations and online tools) or enable virtual classrooms.

But IT departments must also study their own contributions to the campus carbon footprint and plan for carbon reductions. If the average university produces between 200,000 and 500,000 metric tons of CO₂ (a figure frequently quoted by Global Action Plan), then universities have a responsibility to lead a global carbon reduction strategy by modeling it within their own walls. Through server consolidation, virtualization, data center design changes, and optical networks, campus IT departments can lead that charge.

**IT As Part of Campus-Wide Sustainability Efforts**

Although IT leaders have not always been at the table during campus conversations about sustainability, the tools of their trade have been both panned as culprits in the rise of carbon emissions and praised for their power to provide relief for the world’s climate woes. Advances in campus networks and emerging Web 2.0 tools for collaboration and dissemination offer real promise for curbing administrative waste. Other advances, such as more-nimble web-conferencing services, could provide alternatives to campus travel. The tools of campus IT departments are increasingly offering ways for universities to “use wiser and impact smaller.”
Reducing Campus Waste

Campuses are turning to creative printing solutions to combat a rise in paper consumption across campus. Despite the increasing digitization of course materials and administrative documents, campus computing labs, in general, have reported an increase in printing. To buck the trend, the College of New Jersey implemented PrintSense in fall 2005, limiting student printing to 600 pages per semester and charging $.05 for each additional page over that allotment. Since the program launched, the college estimates that students have saved more than four million printed pages. Other campuses have modified default print settings to encourage double-sided printing or replaced standard paper with postconsumer recycled paper. Campuses have also engaged in print-education campaigns, encouraging students to “think before you print” by reducing font sizes, for instance, or printing multiple PowerPoint slides per page.

Reducing Staff Travel

To help reduce carbon emissions generated by staff travel to and from campus, universities are beginning to either expand or formalize campus teleworking policies to enable working from home. Collaborative online environments like Google Docs and SharePoint allow off-site employees to gain access to shared documents and exchange information with colleagues on campus. Wider broadband access and VPN servers allow users to have access to many of the same online services they would have in the office.

Eliminating Commuter Traffic

Staff aren’t the only carbon culprits on campus. Student commuters clog campus parking lots, leading many campus administrators to consider moving more face-to-face courses online to cut down on the impact of student commuters. It’s estimated that the number of college students taking at least one online course has doubled in recent years, but what was once a solution for older, working students has become increasingly popular for traditional-age commuters and even residential students. Better tools for content delivery and collaboration have bolstered the online education world, helping faculty teach in content-rich virtual worlds like Second Life or through synchronous delivery options like web conferencing or streaming video.

Offering Tools for Assessment

At the website myfootprint.org, individual consumers can enter data on various metrics for their lives, from annual air travel to the size of their home, and then compare their personal carbon footprint to national and global averages. Although not the most scientific tool on the web, the quiz exemplifies the potential power of web tools for helping consumers and campuses measure their environmental impact and assess measures for reducing carbon emissions. AASHE offers members a suite of online assessment tools, and the Campus Sustainability Assessment Project (CSAP) proposes metrics for campuses to measure their own sustainability efforts. CSAP also features a searchable database that lets users track, read, and find contact information based on assessment from across the country. Users can also search for reports that meet best practices criteria set by the CSAP.
Offering Tools for Information Dissemination

Summit attendees agreed that a critical piece of maintaining campus sustainability efforts is generating buy-in among constituents. Viral Web 2.0 tools like blogs, wikis, social networks, and video-sharing sites like YouTube can help sustainability groups maintain and build momentum around campus initiatives. The sustainability office at the University of North Carolina at Chapel Hill, for instance, has a page on Facebook, a popular social networking site. The office posts photos of sustainability products, a Carolina Green video that details green efforts on campus, and useful links for students. The University of California, Berkeley, updates a sustainability blog that keeps faculty and students in the know about major university initiatives or state environmental news, such as a new carpool application on Facebook.

Green IT as a Strategy

Despite the role of technology as a facilitator for campus-wide sustainability efforts, IT also has a significant role to play in reducing the institutional carbon footprint. At the University of Michigan, for example, officials estimate that campus computing generates about 65 million pounds of carbon emissions annually, equal to an annual price tag of about $4.8 million in electricity costs. They’ve recently set a 10-percent reduction goal that focuses on slashing computing consumption. The university is one of a handful of institutions that have joined Intel and Google in the Climate Savers Computing Initiative, which hopes to cut computer energy consumption in half by 2010. The nonprofit alliance estimates that reducing consumption this much could slash carbon emissions by 54 million tons a year. This new focus on green IT as a strategy for carbon neutrality is prompting campus IT departments to turn a keen eye toward consolidation and reduced consumption.

Server Consolidation

On a university campus, individual departments or research units may own and manage their own local servers, each of which is responsible for a significant share of the campus carbon footprint. Yet researchers and administrators may be hesitant to cede operation of these servers to a central IT organization. These “server huggers” may fear losing control of sensitive research data or losing access to critical documents. Campus IT departments are increasingly looking toward consolidating local servers into campus data centers, reducing the impact of underutilized servers and reducing the number of machines on campus.

Data Center Air Handling

Within campus data centers, simple changes like raising the temperature or leveraging the natural heat flow through hot/cold server configurations can also significantly cut energy consumption. The premise that data centers need to be cool to prevent equipment malfunctions and failures needs to be challenged. Manufacturer-published temperature ranges for components in a typical rack often allow operating temperatures of 90 degrees Fahrenheit or higher. Air-side economizers can also be used to significantly reduce HVAC costs.
Virtualization

Campuses are also looking past physical data servers to experiment with virtual and cloud computing, which leverage the Internet and virtual machines to reduce the number of physical servers on campus. Server virtualization can be met with resistance across campus, by researchers or administrators who often fear the loss of control and privacy when information moves outside the confines of an individual department.

Power Management Schemes

Providing 24 × 7 access to campus computing labs often means that desktop computers remain on and idle for several hours each day. Simply switching an idle monitor to sleep mode can reduce energy by more than 60 watts an hour. To cut energy consumption in labs, IT departments can set default monitor settings to go into sleep mode during periods of inactivity or investigate energy-management software packages that manage computer configurations from a central console.

Equipment Replacement Cycles

The average LCD monitor consumes about one-third the energy of the average CRT monitor, prompting campus IT departments to systematically work to replace CRT monitors or to move toward laptop computing. Campus IT departments can also create equipment policies that require ENERGY STAR–compliant devices or more energy-efficient computer models.

Campus Snapshot

If we accept that campus IT has a significant role to play in larger campus sustainability efforts—both as a consumer of energy and a potential solution for alternative activities—what would a comprehensive plan for green IT look like at an institutional level? At the EDUCAUSE summit, the spotlight turned to the University of California, Irvine, where Wendell Brase, vice chancellor for administrative and business services, offered a look inside the institution’s aggressive approach to green IT.

From a shuttle bus fueled by soybeans to the cultivation of an incentive-based campus rideshare program, UC Irvine has been at the forefront of campus greening efforts nationwide, most recently winning California’s highest environmental honor, a 2008 Governor’s Environmental and Economic Leadership Award, for their Sustainable Transportation program.

The entire UC System, recently ranked No. 4 on the Sierra Club’s list of “cool” campuses for its efforts to address the causes of global warming, has pursued a rigorous green agenda since 2002, when campus leaders began collaborating with staff and students to pen new policies aimed at promoting environmental stewardship. The system’s Policy on Green Building Design and Clean Energy Standards was implemented in 2004 and was later expanded to include sustainable transportation practices, greenhouse gas reductions, green building renovations, waste reduction, and environmentally preferable purchasing. Most notably, the
system’s 10 campuses have agreed to pursue an ambitious target of returning to 2000 emissions levels by 2014 and to 1990 levels by 2020. The latter would represent a 25-percent cut in emissions. According to Brase, meeting those goals at UC Irvine requires a multiyear approach that focuses first on changes that deliver the greatest impact to the campus carbon footprint—server consolidation, desktop virtualization, PC power management—with a plan to address smaller-impact projects at a later date. “We’re not taking a small bite,” he told summit attendees. “We’re taking a big bite.”

Taking a “big bite” has meant pursuing a detailed and carefully phased plan that targets the major factors impacting energy efficiency on campus: facilities management of power delivery and heat removal; user behaviors such as desktop power management and printing; and IT management for efficient processing, storage, and supply. In the face of such a daunting challenge, Brase said, large, institution-wide projects should be the first approach, not a distant goal.

Accordingly, IT management has been a central component of the university’s wider sustainability agenda, culminating in a three-phased approach to take immediate steps to reduce the environmental impact of IT on campus while committing the campus to even bolder retrofitting solutions in the future.

**Immediate Actions**
- Decommissioning or further consolidating unneeded or underutilized hardware
- Creating a procurement policy that requires, wherever possible, equipment rated by ENERGY STAR or the Electronic Product Environmental Assessment Tool
- Ensuring that desktop and printer power-management settings are enabled
- Enabling server power-management features
- Raising the temperature in campus data centers
- Creating a cooler/warming aisle configuration for equipment racks to reduce the speed of cooling fans

**Three- to Six-Month Actions**
- Completing an energy audit
- Implementing server virtualization to eliminate, where possible, the use of physical servers and to better utilize those physical units still in use
- Replacing CRT monitors with more efficient LCD units
- Replacing fixed-flow perforated floor tiles with higher flow adjustable tiles to improve subfloor air flow

**One-Year Actions**
- Implementing desktop virtualization where possible
- Replacing data center equipment with more efficient units
- Creating centralized control and monitoring of chilled-water units
Brase left summit participants with two words of advice: Think big. “The scale of these problems is enormous; [implementing changes] that will only change a few percentage points is just taking time away from [larger initiatives.]”

**An Action Agenda**

At the close of the summit, attendees began drafting their own, personal commitments to “thinking big” and fostering collaborations between campus IT departments and the wider sustainability efforts at their institutions. Several attendees said they plan to organize mini-summits on their campuses, bringing back the knowledge gained in Adelphi and challenging their constituents to think creatively about the challenges that lie ahead. Others pledged to begin establishing a baseline assessment of carbon emissions and to use those figures as a mandate for change. Some suggested specific steps their departments could take to reduce carbon output, from better promoting rideshare programs to limiting staff travel.

While the specific plan will vary from campus to campus, attendees agreed that higher education, as a whole, needs a shared blueprint for the future, one that commits the nation’s colleges and universities to a bold and specific sustainability agenda focused on slashing carbon emissions and better educating their constituents. But unlike the American College & Universities Presidents Climate Commitment and similar documents, this blueprint would put campus IT at the center of the discourse, suggesting ways that IT might bolster institution-wide efforts and set the standard for an ambitious and future-reaching strategy for carbon reduction.

Their action agenda outlines both the basic principles of a campus response to the global climate crisis that is propelled by IT and individual steps that they—or the community at large—might take to move forward:

- IT departments and organizations should take a more proactive role in the dialogue surrounding climate change and energy reduction strategies.
  - Associations should work with institutions to publish white papers, case studies, and other scholarly resources that clearly define the challenges ahead and suggest strategies for moving forward.
  - Campuses should publicize their own sustainability practices and goals, offering themselves as examples to their surrounding communities.
  - Individual institutions should seek and foster partnerships with local governments and private industry to engineer collaborative solutions and cooperative agendas.
- The argument for campus sustainability must be rooted in established research and real results, creating a compelling case for immediate and far-reaching action.
  - Institutions can support and disseminate research that clearly outlines the impact of higher education on the global climate crisis with a focus on how individual actions and behaviors translate into carbon emissions.
Institutions can contribute to a growing understanding of the climate change problem through academic research and the establishment of a common vocabulary that clearly addresses terms like *cap and trade* and *carbon taxes*.

Campuses can develop online tools that identify the impact of individual behaviors on the larger environment, creating opportunities for individuals to monitor and see the impact of their own choices.

Campus sustainability must be at the top of the university’s agenda and its importance reflected in future budget and staffing directives.

Associations and thought leaders should help develop resources that “make the case” to campus CIOs and administrators, creating tangible links between carbon-reduction efforts and the overall economic and physical sustainability of the campus.

Individual campuses should consider sustainability summits or other activities that bring all parties to the table around the topics of sustainability and carbon reduction.

Sustainability planning must permeate all levels of the institution, from purchasing policy to student behaviors to educating future leaders in this field.

University administrators should consider mandating policies that encourage environmentally conscious behaviors, from purchasing contracts that require ENERGY STAR–compliant devices to campus-wide reduction targets.

Campus sustainability committees should reflect the breadth and depth of the problem, encouraging participation from students, faculty, and staff and all departments on campus.

Institutions should look for ways to engage students in the dialogue, from campus competitions to undergraduate research and rewarded behaviors.

Institutions should embed in their curriculum programs that will train future leaders in sustainability.

The community, as a whole, must be committed to openness and sharing, fostering an open dialogue between institutions and campus departments.

Institutions should collaborate on a shared repository of best practices that outlines the steps individual campuses are taking and their impact on environmental sustainability.

The community should provide for and encourage the use of tools for emissions reporting.

Higher education associations could provide a vehicle for information sharing, creating a vibrant sustainability network and repository that lets campuses report about what they are doing and helps individuals find peers with answers at other campuses.
The Role of IT in Sustainability

The community should work together to establish benchmarks for carbon reduction, setting bold goals for the wider higher education community.

IT leaders could collaborate on a set of shared metrics for measuring green IT.

Carbon emissions reductions must be at the top of the agenda, requiring bold and immediate steps that will generate wider impact.

If they have not done so already, individual campuses should commit to an annual energy audit, using those figures to shape wider campus goals for emissions reductions.

Campuses should consider technological strategies to reduce vehicle emissions on campus, from expanding distance education to encouraging telecommuting.

Professional associations should craft their own green agenda and consider professional development events that are either hosted online or foster community through online collaboration tools.

Institutions should take a critical look at campus work and course schedules to search for opportunities to limit travel to campus.

Campuses should explore the possibility of an institutional cap-and-trade system that rewards departments for reducing emissions and fosters the development of an energy economy on campus.

IT should lead institutional approaches to carbon reduction, setting a bold example for immediate and far-reaching action.

Institutions should research opportunities for server consolidation and redesigned data centers.

The IT industry, as a whole, should explore opportunities for a “higher education cloud” for all to use.

Departments should work to implement better energy-management programs.

Conclusion

As the first day of the summit came to a close, one attendee—reflecting on the sobering statistics and staggering challenges that lie ahead—wondered aloud whether any of these efforts would “really be enough” to make a difference. No one offered an answer. Instead, the first day concluded on a somber note, as another participant stood up to implore participants to take the issue to heart. “This is not just about saving our planet,” she said. “It’s about saving our civilization—preserving our civilization into the future.”

By the end of the next day, attendees seemed to take those words as a rallying cry, committing themselves and their institutions to proactive steps toward carbon neutrality and more responsible energy consumption. Each seemed to accept the challenges set forth by both the Presidents Climate Commitment and the IPCC’s
2007 report—to commit human society, and higher education specifically, to a
greener, cleaner, more environmentally responsible future.

If that momentum continues to build and campuses continue to look toward
innovative solutions and collaborative partnerships for a sustainable future, it might
just be enough.

Endnotes

1. American College & University Presidents Climate Commitment,
   http://www.presidentsclimatecommitment.org/.

2. The Leadership in Energy and Environmental Design (LEED) rating system was developed by the U.S.
   Green Building Council, a third-party group, to establish standards for environmentally sustainable
   construction. The system addresses sustainable site development, water savings, energy efficiency,
   materials and resources, indoor environmental quality, and innovation and design. For more
   information, visit http://www.usgbc.org/.

   2009/executive-summary/key-findings.


   Online, April 23, 2008.


9. Carbon offsets help businesses, campuses, or individuals reduce their carbon footprint by purchasing
   financial units that represent reductions in greenhouse gas emissions. The reductions are typically
   generated by alternative energy sources that reduce emissions, such as wind farms or hydroelectric
   dams.


11. The University of Southeastern Louisiana, for example, offers “Think Before You Print” options on

12. Several institutions have posted links to their teleworking policies on the EDUCAUSE site under the
    term “Telecommuting.”

13. Richard Lake, “More students going to college without actually going to college,” Las Vegas Review-
    Journal Online, December 1, 2008.

14. The database is now searchable online at

    30, 2008.

16. A “carbon neutral” campus achieves a zero balance of carbon emissions both by slashing its output
    and investing in energy sources or programs that reduce greenhouse gases.

17. The UC System’s efforts are part of a statewide commitment to reducing carbon emissions. In 2002,
    the California legislature passed a bill that requires a 25-percent reduction in state CO2 emissions by
    2020, with the first major controls taking effect in 2012.

18. Campuses can “virtualize” servers by running multiple independent virtual operating systems on a
    single physical computer. It is a way of maximizing physical resources to maximize the investment
    in hardware. For more, see George Ou, “Introduction to server virtualization,” TechRepublic, May 22,
The Role of IT in Sustainability

Summit Attendees

Gary Bachula, Internet2
Suresh Balakrishnan, University System of Maryland
Mark Beck, University System of Maryland
Wendell Brase, University of California, Irvine
Joel Cooper, Carleton College
Linda Croll-Howell, Cornell University
Joyce Dickerson, Stanford University
Aroth Hassler, Georgetown University
Norma Holland, EDUCAUSE
Cynthia Golden, EDUCAUSE
Esther Iglich, McDaniel College
Nancye Jenkins, University of New Hampshire
Edward Kelty, Rio Salado College
Lida Larson, EDUCAUSE
Lucinda Lea, Middle Tennessee State University
Terry Link, Michigan State University
Mark Luker, EDUCAUSE

Michele Madia, NACUBO
Jenny Mehmedovic, University of Kansas
Richard Mendola, Emory University
Aisha Moore, EDUCAUSE
Pattie Orr, Baylor University
Carie Page, EDUCAUSE
Carol Peddie, Middlebury College
Robert Renaud, Dickinson College
John Sherwood, Dalhousie University
Don Spicer, University System of Maryland
Bill St. Arnaud, CANARIE, Inc.
Noelle Studer, Portland State University
Paul Sullivan, Indiana University
Dallas Thornton, San Diego Supercomputer Center
H. David Toss, University of Vermont
Fran White, Goucher College
Ron Yanosky, EDUCAUSE Center for Applied Research

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