Good Citizen or Leader: The Case for Green IT

Richard N. Katz, EDUCAUSE
Overview

Since the computing behemoths of the 1940s and the ARPANET nodes of the 1960s were fired up, information technology (IT) has consumed an increasing portion of both the budget and the preoccupations of academics and higher education leaders. On one hand, the teaching-intensive, residential institution of 2010 could easily be recognized and understood by famous Oxonian humanists such as Francis Bacon, Thomas More, or John Locke. On the other hand, Cambridge scientists Charles Darwin, Henry Cavendish, and Lord Kelvin would be stupefied and dazzled. Science, in particular, has been transformed by information and communication technologies; in fact, the simulations made possible by these technologies are now characterized with theory and experimentation as the third leg of science.

Two important questions underlie the role of IT in higher education. The first is the question of whether IT functions as a tool or an agent. Most scholars support the position described by Princeton’s Stanley Katz, who argues that “technology is not something that happens to us. It is something we create. We must not confuse a tool with a goal. We must, therefore, be sure that technology serves the fundamental purposes of higher education.”¹ This “instrumental” view of IT is contrasted with the characterization of UC Berkeley’s Martin Trow. Trow argues that “IT will cut its own channels, leading to the creation of institutions that differ from those of today, institutions where the weight of history does not condition and constrain IT’s use.”² The question of whether IT is a tool or an agent of transformation frames a second important question; that is, is the IT leader a good campus citizen, providing increasingly for the smooth operation and risk management of IT-enabled academic and business processes, or is this person a change agent who sees the technologically etched writing on the wall and works so that the channels that are cut by IT are anticipated, or even leveraged.

In April 2010 the EDUCAUSE Center for Applied Research (ECAR) published Powering Down: Green IT in Higher Education, a research study by Mark C. Sheehan, with Shannon D. Smith. This 2010 study examines the stance institutions and their central IT organizations are taking on environmental sustainability (ES), the progress they are making on a variety of key initiatives, and how the work they are doing is helping them become more environmentally responsible in their business, instructional, and research activities. This ECAR research bulletin builds on the ECAR green IT study. Although this bulletin is not a digest of that study, it is offered as a general window onto our professional community. ECAR studies continually demonstrate that IT in higher education is underfunded, relative to our ambitions and dreams. In most cases, IT leaders can and do discriminate among the noisy and often subtle exhortations to lead. In many cases, we have learned to “satisfice”; that is, to lead by choosing when “good enough” is, in fact, good enough, and when it is not.

Highlights

The issue of environmental sustainability presents a new opportunity for higher education in general and IT leaders in particular to play out choices of good citizenship
or leadership. In 2007, the leaders of the United Nations Intergovernmental Panel on Climate Change (IPCC) were awarded the Nobel Peace Prize for their assessment of the physical science basis of global climate change. That report concluded that climate change of global and possibly irreversible scope and nature were the result of the rising atmospheric concentration of carbon dioxide (CO2), and that human activity was accountable for this rise in CO2. The implications of this climate change on future climatic conditions range from very bad to dire, depending on which end of the statistical planning ranges you use. As regards energy dependence and price volatility, between January 2002 and July 2008, mid-grade gasoline in the United States rose from $1.15 per gallon to over $4.15, before dropping again to nearly $3.00.

Energy has always factored heavily into the political economy of the world. As energy supplies dwindle, and as emerging nations fan demand for energy to drive their growing economies, prices rise, interruptions in energy supply abound, and political and military tensions escalate. Many, with justification, view the current conflict in Iraq as revolving largely around U.S. needs to secure supplies of oil. Many futurists identify the quest for energy as the defining issue of this new century, and whether the chief concern is cost, energy security, or climate change, all roads lead to a similar destination.

Against this backdrop, a group of college and university presidents and chancellors expressed their deep concern “about the unprecedented scale and speed of global warming and its potential for large-scale, adverse health, social, economic, and ecological effects." These leaders acknowledged the scientific consensus of the IPCC and “the need to reduce the global emission of greenhouse gases by 80% by mid-century at the latest, in order to avert the worst impacts of global warming and to reestablish the more stable climatic conditions that have made human progress over the last 10,000 years possible.” Arizona State University President Michael Crow argued that “…universities must take leadership roles to address the grand challenges of the twenty-first century, and climate change is paramount amongst these.” Today, nearly 700 college and university presidents or chancellors have signed the American College and University Presidents’ Climate Commitment (ACUPCC), pledging to engage in a wide variety of campus activities to reduce their institutions’ carbon footprint, to lower their use of energy, and to minimize waste.

According to experts such as Simon Mingay, research vice president at Gartner, at the precise time when our consciousness, consciences, and students have focused on the political economy of sustainability, “We have estimated that ICT is responsible for approximately 2% of global GHG emissions, everything else obviously accounting for 98%.” This estimate—comparable to the energy footprint of aerospace—does not include the cost of cooling data centers.

Understanding the energy footprint made by computing and communications is complex and controversial. Nevertheless, it is quite simple to assert that the contribution of the IT infrastructure and its use to CO2 buildup and energy consumption is significant (and growing!). Well known author Nicholas Carr has calculated that maintaining an avatar in Second Life requires 1,752 kilowatt hours of electricity per year. That is almost as much
energy as is used by the average Brazilian. Clearly the higher education IT community can make an important and lasting impact in the institutional—and global—sustainability effort.

**How Has the Higher Education IT Community Reacted?**

ES touched a positive nerve in higher education. First, much of the groundbreaking research has been based both at research universities and national laboratories. This work has always been computationally intensive and is appreciated in higher education’s IT community. Second, the green movement has also had a secure and important place among higher education faculty, students, and staff. College towns often rate high on environmental performance criteria in popular rankings of cities and towns.

It is not surprising, then, that so-called green IT—the set of practices that could reduce the energy cost and carbon footprint of enterprise IT in higher education—rose quickly in the ranks of EDUCAUSE member concerns and was declared a focus area for EDUCAUSE in 2009. Against this backdrop, ECAR, in consultation with the EDUCAUSE executive team, agreed to conduct a study to ascertain the state of the practice as regards “green” efforts in higher education IT organizations. The ECAR study, *Powering Down: Green IT in Higher Education*, concludes that while the majority (79.6%) of survey respondents claim that CIOs place a high priority on environmental sustainability, many survey respondents are poorly informed about initiatives outside their own units. In addition, CIOs often lack critical information about their own organization’s energy footprint. Further, it is very uncommon for IT organizations to have measurable goals for green IT.

When asked to describe the role of the IT organization in the campus environmental sustainability mix, respondents described a generally understated role (see Figure 1).

![Figure 1. Role of the Senior-Most IT Leader in Institutional Environmental Sustainability Efforts (N = 258)](http://www.educause.edu/ecar)


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More than one respondent in six (17.5%) is on the sidelines, playing either no role or merely observing campus sustainability efforts. By the same token, nearly 16% describe themselves as a leader in campus efforts. Two-thirds of respondents (67.0%) are in fact participating in their campus sustainability efforts. Of these, just over a third are playing active advisory roles.

**Should We Do More?**

Interpreting data is typically more art than science, as interpretation carries with it the *a priori* beliefs of the researcher. The question always guiding or dogging an analysis is whether or not a particular finding is surprising. The early story of green IT is somewhat surprising. The ECAR findings raise the questions: Is the hoopla regarding climate change important, and does the enterprise IT organization have a significant contribution to make? For my part, the answer to these questions is yes. Not only is IT’s power consumption a significant contributor to the deleterious effect of atmospheric CO₂, but college and university students are often passionately committed to environmental causes. David Soto of *The Princeton Review* says that “two-thirds of students surveyed for the Review’s recent ‘College Hopes and Worries’ survey said a college’s ‘environmental commitment’ would be a factor in where they applied.” It seems higher education leaders can overlook the sustainability issue only at their peril, particularly leaders at those institutions that have signed the Presidents’ Climate Commitment.

If we agree that ES is durably important to higher education, what can we say about the contribution that enterprise IT organizations can make to institutional sustainability? It seems to me that IT controls or influences one of the four great throttles at our institutions’ disposal. It is clear to everyone that campus facility organizations manage the campus power plant and thereby the choices and nature of energy supply. They also control or influence the energy profile of campus lighting, and they control or influence temperature settings and other key drivers of campus energy consumption. They can influence energy metering, prescribe smart buildings, and recommend chargebacks and other practices that might influence consumption patterns of people throughout the institution. For these reasons, facilities organizations are often found at the helm of higher education sustainability efforts. Similarly, campus human resources (HR) and purchasing organizations are well positioned to influence institutional progress on environmental sustainability. HR and procurement policies can influence or prescribe energy consumption or conservation patterns and behaviors among many campus stakeholders. Likewise, because enterprise IT organizations influence or control campus technology standards and procurements, they too can manage the incentives and sanctions that shape the energy footprint of an institution’s portfolio of personal computers, servers, storage devices, networks, and so forth. Even more, most college and university IT organizations themselves operate data centers and advise on high-performance computing clusters, and they are thus in a position to directly influence very consequential choices. Enterprise IT leaders are also positioned to either manage or create the incentives that promote the virtualization and consolidation of institutional IT resources and even services.
I conclude, therefore, that environmental sustainability is important and that the IT organization is well positioned to “move the needle” in this area.

But the green IT movement in higher education is poorly resourced. Only 6.4% of those responding to the ECAR survey have allocated one or more FTE to the challenge. Fewer than one-quarter of the respondents could point to a committee that has been created to guide campus green IT efforts. As a result, it appears that the green IT challenge is another unfunded mandate. The green IT study also rediscovers a responsibility gap—that is, the gap between the broad enterprise charter of central IT (what is expected) and the narrow IT influence wielded (what can be delivered) by most. The data from this study in particular paints a portrait of central IT organizations neither aware of nor influential on IT energy-related choices closer to their institutions’ academic core. For example, while many respondents report having responsibility or influence over purchasing choices for low-tech equipment (personal computers, printers, etc.), few have the influence to guide the purchase of high-tech, server-related initiatives outside the direct control of the central IT organization. According to study author Mark Sheehan, “Distributed IT facilities existed at about half of respondent institutions but were terra incognita to many respondents.”10

Sheehan also found that most survey respondents have defined their contribution to the green IT challenge narrowly. Those who are active are generally exploring ways to reduce the carbon footprint of the central IT organization and perhaps to garner support for the widespread purchase of ENERGY STAR equipment. Some are virtualizing computing and storage, an effort that gets you out in the world. Few, however, seem to be bringing big ideas to the table. Such ideas include instrumenting and controlling all campus devices that regulate power consumption, or identifying options to support widespread telecommuting, or finding ways to accelerate the hybridization of course offerings to reduce power loads on campus.

Notwithstanding the general finding that green IT is a cherished but under-resourced vision that is agreeable to most but somehow out of reach because of financial exigencies or governance challenges, successes—large and small—can be found. In the case of New York’s Adelphi University, a motivated CIO has energized his team and his campus to drive a variety of small, steady, and positive outcomes, such as:

- Reduction of paper use
- Widespread deployment of energy-efficient monitors
- Remote shutdown of lab computers
- Conversion to energy-efficient servers
- Transition to virtualization software
- Consolidation of storage
- Installation of energy-saving equipment
At the other end of the spectrum, the members of BCNet, British Columbia’s government and university-funded provincial provider of high-performance research and education networks, have pooled resources to explore the feasibility of building a province-wide data center that would be powered by hydroelectricity. The project is a demanding example of the potential to rethink the locus of data center operations, both from the perspective of sharing services and thus capturing scale economies and of shifting to renewable energy sources. The BC government is setting an example and working to ensure that its operations, including colleges and universities, are carbon neutral for 2010 and every year thereafter. Provincial legislation enacting this intention is the first of its kind in North America. As part of this commitment, everyone who works for the province will be required to:

- Measure their greenhouse gas emissions;
- Reduce these emissions as much as possible;
- Offset the remaining emissions by investing in projects that reduce greenhouse gas emissions, so that the net effect of government activities is carbon neutral; and
- Report out publicly on plans and actions to reduce emissions.

**What It Means to Higher Education**

The data from the ECAR *Powering Down* study and the discussion above bring us back to the complex topic of IT leadership. Are we the swashbuckling agents of change—epic leaders who can divert Martin Trow’s raging current of technological change to ensure our institutions’ safety and prosperity? Or are we the proverbial extroverted geeks, who look at the other guy’s shoes? Are we awaiting a call to serve, or are we rallying our institutions?

**Lead, Follow, or Get Out of the Way**

The leadership questions are, of course, intentionally polarized. The IT leader, like all leaders, must pick his or her fights. In the case of networks, many of us chose in the 1980s to fight the good fight. In so doing, we changed forever the landscape of higher education and, indeed, the world. In the 1990s, we made the case for ERP. While many of us modernized our core enterprise technology, few of us can claim that those investments of money and effort fundamentally changed how we did business or differentiated us from one another competitively. We led again with an enormous load of Y2K fixes in order to avoid bad things. We learned that avoiding bad things rarely drives an organization forward. And most recently, circumstances conspired to activate us to lead our institutions in the IT security arena. ECAR studies document here the story of a somewhat complacent and under-resourced leadership being jarred into action by a series of headline-garnering events. These stories suggest that the question is not whether IT leads, but when. And some of us look to cloud computing and above-campus services as another opportunity for IT to lead.
A 2010 Gartner study might help us understand when and why IT leaders choose leadership roles, citizenship roles, or even followership roles in a given arena. First, we can all agree that few if any of us are resourced at levels necessary to demonstrate leadership in all that we do. As illustrated in Figure 1, it follows, therefore, that effective CIOs deliver the level of capability desired by the institution. Gartner here defines the capabilities desired as: functional, enabling, contributing, or differentiating.

Figure 1. Effective CIOs Deliver the Level of IT Capability Required by the Enterprise


If this is so, IT leaders in higher education must become adept at distinguishing between and among the levels of capability that are possible, and even more important, must discriminate carefully among the mixed and subtle signals they are likely to be hearing from institutions and their leaders.

Discriminating between the urgent and the important, the ordinary and the extraordinary, the wait-to-be-asked and the time-is-now, is very nearly always context-specific. The replacement of an enterprise system may be urgent and important for one institution in 1999, and unnecessary at another a decade later. That said, some efforts do demand attention, and discerning such efforts and giving them voice is one important task of the community’s professional association.

Questions to Ponder

The central question raised by the ECAR study of green IT in higher education is whether green IT is a topic—like IT security a decade ago—that merits a push? The gap between the promise of green IT and the apparent level of IT capability that has surfaced leads to a number of questions.

First, is ES really important to us? Have hundreds of presidents and chancellors signed on to a commitment as a political expedient or a publicity stunt, or is the reality of driving the ambitious outcomes specified in the commitment more daunting than we supposed? The data seems quite clear that in cases where campuses are demonstrating institutional
commitment and progress toward environmental sustainability, central IT organizations are more likely to be mobilized around green IT and to show demonstrable progress.

Second, can we do much? Do we understand what can be done, and do we have the skills, knowledge, abilities, and mandate to carry out a thorough green IT agenda? Does our highly devolved governance preclude success? Can one educate our communities to do the right things, vis-à-vis green IT acquisitions and use, or must our policies be changed to reward those behaviors that will drive good sustainability outcomes?

Third, can we build meaningful sustainability programs in the absence of data? According to Sheehan, fewer than 15% of survey respondents reported having measurable goals in any green IT area of activity. Fewer than 25% of responding IT organizations even account for their own power consumption on campus, and few have reasonable proxies that would make accounting for progress (or slippage) possible.

EDUCAUSE got it right when we raised the alert level on IT security. Good enough was not good enough and we dug collectively deeper into our pockets, developed new competencies, and have made IT security an important and accepted feature of the higher education IT landscape. CAUSE got it wrong when we admonished the community to adopt Distributed Computing Environment (DCE). Whether data management or green IT deserve a call-out is a matter for discussion and debate within the community. It must be noted that many priorities cry out for a diminishing pool of investment dollars. Nonetheless, it is important to discuss current research findings, particularly when they point to contradictions between our realities and our rhetoric.

**Key Questions to Ask**

- What statements has our institution made regarding our institution-wide commitment to environmental sustainability?
- Has our institution issued a mandate in support of our environmental sustainability goals? If so, to whom does that mandate apply?
- What structures are in place to monitor progress and compliance with our environmental sustainability efforts?
- What role does IT play in our environmental sustainability plan?
- What barriers must be overcome by IT and the institution at large with respect to environmental sustainability?

**Where to Learn More**

- American Association for the Advancement of Sustainability in Higher Education. *Implementation Guide* (for the American College and University Presidents’ Climate Commitment).
  [http://www2.presidentsclimatecommitment.org/pdf/ACUPCC_IG_Final.pdf](http://www2.presidentsclimatecommitment.org/pdf/ACUPCC_IG_Final.pdf)


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Endnotes


5. American College & University Presidents’ Climate Commitment, Commitment Text. See http://www.presidentsclimatecommitment.org/about/commitment.

6. Ibid.


About the Author

Richard N. Katz (richard.n.katz@gmail.com) is former Vice President of EDUCAUSE and Founding Director of the EDUCAUSE Center for Applied Research (ECAR).

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