

GOING FOR ZERO

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Commitments to carbon neutrality have challenged colleges and universities to rethink their energy options and infrastructure, prompting creative financing approaches and new education and outreach opportunities.

By Karla Hignite

Arizona State University, Tempe, has more photovoltaic panels (78,000) than students (76,000) on its four campuses. The combined solar-generation capacity of these 80-plus systems is 23.5 megawatts—more than any other U.S. higher education institution, according to Morgan Olsen, ASU's executive vice president, treasurer, and chief financial officer. That capacity will climb to 25 MW by the end of this year.



"In total, these panels represent more than \$150 million in third-party capital investment through public-private partnership agreements—money that ASU hasn't had to spend and that doesn't add to the institution's debt load," underscores Olsen. They also reflect ASU's aggressive shift toward renewable energy and the institution's commitment to carbon neutrality.

Since 2005, ASU has reduced its greenhouse gas emissions by 15.3 percent—a significant achievement given that during this time the university has added 29 percent more space and increased its student population by 33 percent, notes Olsen.

READ AN ONLINE EXTRA

For more about Pacific Lutheran University's zero-waste effort, see *"Rethink Your Trash"* in *Business Officer*. Plus at www.nacubo.org.

In 2006, ASU President Michael Crow became one of 12 founding members of the American College and University Presidents' Climate Commitment (ACUPCC)—a voluntary partnership of higher education presidents pledging that their institutions will achieve carbon neutrality by or before 2050. ASU's neutrality initiative calls for 100 percent mitigation of building energy, solid and water waste, and agriculture and refrigerant emissions by 2025, and 100 percent mitigation of all emissions—including transportation—by 2035.

David Hales, former president of the College of the Atlantic and also a founding member of the ACUPCC, is now president of Second Nature, the lead supporting organization for the ACUPCC and its nearly 700 colleges and universities that have pledged neutrality. While ACUPCC signatories represent only a portion of the roughly 4,000 traditional colleges and universities across the United States, since the launch of the commitment, many nonsignatories have likewise adopted strong local energy conservation and efficiency programs, notes Hales.

"Carbon neutrality is only part of our story," stresses Monica Rimai, vice president of finance and administration at Portland State University, Portland, Oregon. PSU's sustainability ethos encompasses a

How to pay for carbon mitigation and the range of initiatives and strategies it entails has posed a challenge for many colleges and universities.

broad range of efforts focused on energy and water conservation, transportation, purchasing, waste reduction, and composting and recycling, notes Rimai.

At the same time, PSU leaders understand the value of the ACUPCC for the organizing framework it provides to get people focused on measurable actions and goals, hold leaders accountable to those goals, and elevate and extend the conversation campuswide

about the real impacts of climate change and what can be done, says Jennifer Allen, director of PSU's Institute for Sustainable Solutions.

In addition to large-scale energy efficiency and conservation projects like PSU's centralized district heating and cooling plant and internal and external lighting upgrades, carbon-mitigation strategies have included power management settings on campus computers and monitors and space consolidation for evening and weekend classes to avoid heating and cooling underutilized buildings.

Currently university leaders are especially focused on the embodied emissions related to purchased goods and utilities, which represent nearly half of PSU's greenhouse gas emissions, notes Jennifer McNamara, PSU's campus sustainability manager. In response, PSU has ramped up efforts to decrease inventory of single-use and nondurable goods and is revising procurement policies that focus on life-cycle purchasing and favor more environmentally sound practices by vendors.

78K > 76K

More photovoltaic panels than students on its four campuses

Arizona State University

CARBON TARGET PRACTICE

If the specific strategies for reducing emissions vary widely among institutions based on factors such as institution size, type, and geographic location, so do decisions about selection of target dates for achieving neutrality, an ACUPCC requirement. Luther College, Decorah, Iowa, has pledged to reduce its campus carbon footprint 50 percent by the end of 2015, 70 percent by 2020, and to achieve neutrality by 2030. "From an administrative perspective, when we first committed to 50 percent by 2015, I took a big gulp since we didn't know exactly how we would get there," admits Diane Tacke, Luther's vice president for finance and administration.

Professor of Religion James Martin-Schramm concurs that those targets were partly aspirational. "In viewing the trajectory of our emissions decline, we determined that if we maintained pace we should be able to hit our targets, but it was also important to establish dates that would hold us accountable," notes Martin-Schramm. "One reason we set 2020 as the date to achieve 70 percent reduction was to essentially put ourselves on record and to keep current faculty and staff responsible for the bulk of our commitment, rather than push this to the next generation."

Currently the college has surpassed 40 percent reduction in greenhouse gas emissions since its baseline year of 2003. That's when the institution made a \$1.5 million investment in a major energy audit that yielded a 15 percent reduction in emissions through a variety of efficiency measures. The investment paid for itself in seven years through reduced energy costs.

Since then the college has made subsequent investments in efficiency measures and a major investment in wind energy. The on-campus installation of a single turbine—which supplies about one-third of Luther's power—has further reduced emissions by 15 percent. A second turbine is a possibility, as are potential projects employing solar, biomass, and landfill gas—though these would likely be several years down the road, says Martin-Schramm. The college has also contracted to purchase renewable energy certificates from a community wind project in its region, accounting for another 7.4 percent reduction in emissions.

To reach the halfway mark, Luther is once again investing in efficiency, with a concerted focus on building retro-commissioning measures recommended by a third-party engineering firm. The quick 13-month payback should yield a 5

NEARLY 50%

Percentage of greenhouse gas emissions related to purchased goods and utilities

Portland State University, Oregon

to 10 percent reduction in heating fuel consumption and a 5 percent reduction in electric use, explains Martin-Schramm.

Luther also recently began a room-by-room study of its 1.4 million square feet of building space on campus that focuses on lighting and HVAC improvements. Since half of Luther's emissions are directly related to electricity and one-third are linked to heating fuel, even these smaller gains in efficiency should be enough to push Luther over the 50 percent reduction threshold.

Both Tacke and Martin-Schramm remain confident that Luther will meet its goals. "When you see the progress you are making toward these big targets, it generates an immense amount of excitement and momentum across campus for a whole variety of activities," says Tacke. In recent years college dining services has increased sourcing of local food from 5 percent to 35 percent. Luther's most recent five-year strategic plan calls for a 25 percent reduction in solid waste and 15 percent reduction in water consumption, adds Martin-Schramm. "We've already exceeded our water reduction target and are very close to our solid waste goal."

One key to Luther's carbon-mitigation progress has been ongoing board-level support, says Tacke. Not only did Luther's board embrace the college's pledge in 2007 to become carbon neutral, but board members organized to champion Luther's efforts for getting there. In a strategic move to reinforce Luther's broad commitment to sustainability, in 2012 the college's board of regents created a facilities and sustainability committee, explains Tacke. "If you don't create some mechanism for ongoing board-level commitment, all this can get lost."

In addition to providing leadership continuity for sustainability commitments, this also helps move the conversation away from a singular focus and identifies sustainability as a major component of all college operations, adds Tacke.

Luther's carbon neutrality momentum also gave rise to the college's Center for Sustainable Communities—now \$3.5 million toward its fundraising goal to establish a \$5 million endowment. The center acts as a regional resource for outreach, and coordinates campus and community sustainability efforts and programming spanning renewable energy, sustainable food systems, and sustainable business and entrepreneurship.

NO. 4

Fourth ACUPCC signatory to declare carbon neutrality

Colby College, Maine

NEVER DONE

In April 2013 Colby College, Waterville, Maine, declared carbon neutrality, becoming the fourth ACUPCC signatory to claim this status. A decade prior, the college began purchasing 100 percent renewable electricity. A variety of energy efficiency measures over the years also allowed the college to cut energy consumption by 12 percent per square foot since 2000.

However, the emissions game changer for Colby came in January 2012 when the college's biomass-fueled steam plant went online. The new plant burns low-grade wood chips for heating buildings, hot water, and cogeneration of electricity. According to Douglas Terp, Colby's vice president for administration and treasurer, the switch to wood biomass replaced almost 800,000 gallons of heating oil last year and now redirects approximately \$900,000 annually to the local economy.

The college's climate action plan—based in large part on a Colby student's research thesis—called for reaching neutrality by 2015, says Terp. However, once the biomass plant was up and running and emissions modeling revealed how close the college was to erasing its carbon impact, leadership chose to purchase offsets for the primarily travel-related remaining greenhouse gas emissions that Colby generates in order to celebrate its carbon-neutral status in conjunction with the college's bicentennial.

For 2013, these carbon credits cost the college about \$50,000, paid for from savings accrued when converting from heating oil to biomass as the college's primary heat source, says Terp. Future reductions in emissions on campus should continue to decrease the school's reliance on offsets.

"In some respects we went about this in reverse," notes Terp, acknowledging that the college didn't hire a sustainability coordinator until a month after declaring neutrality. "In part that's because we knew which big-ticket items we needed to tackle first. Now we can look to our sustainability coordinator to devote full-time attention to energy efficiency, communication, education, and outreach, and to building a strong program of involvement for the next generation of students, faculty, and staff."

In fact, says Terp, a key challenge will be reminding members of the campus community that reaching neutrality is not an end goal. "You're never really done. There are and always will be more opportunities for reducing your campus environmental impact."

1 TURBINE

Supplies about one-third of the power for campus

Luther College, Iowa

IN THE PIPELINE

Developing a culture of sustainability is one of three broad goals of the sustainability office at Pacific Lutheran University, Tacoma, Washington, along with achieving carbon neutrality by 2020 and becoming a zero-waste campus. By the time PLU signed the ACUPCC, the university was already addressing significant efficiency measures on the facilities side, says David Kohler, PLU's director of facilities management. Had university leaders considered this concerted focus on carbon neutrality a bit earlier, the college likely would not have installed a natural gas heating system for several of its residence halls, admits Kohler.

Going forward, one area that holds particular promise for PLU is use of geothermal energy for heating and cooling. To date the university has incorporated geothermal systems in two buildings, but leaders anticipate much wider use of this in the rollout of PLU's multiyear project plan encompassing new construction and facilities renovation. "This will make a huge difference in reducing our natural gas use on campus," notes Sheri Tonn, PLU's vice president for finance and operations. In fact, the university already has a system designed and ready to go for five campus residence halls. It's strictly a matter of funding at this point, says Tonn.

"If we found the right donor today, we would take four large natural gas boilers offline tomorrow," confirms Kohler. A priority at present is adapting the mechanical systems elsewhere across campus to ensure that other buildings are project-ready as well. "We're focused on remaining flexible with our units so they can accommodate both hot air or hot water," says Kohler.

PLU is also using its built environment to engage behavioral change. Whereas previously more campus community members were skeptical about the value of the university's commitments to LEED criteria, energy efficiency, and renewable energy, that skepticism is fading, says Kohler. PLU's Morken Center for Learning and Technology is the university's flagship LEED Gold-certified building, employing geothermal heating and cooling. "Employees love it," says Kohler. "It's the most comfortable building on campus, and has made believers out of a lot of people about what we're trying to implement campuswide."

SHIFTING THE CONVERSATION

The University of Vermont, Burlington, has tracked its greenhouse gas emissions since 2000, with data back to 1990. Over the years UVM has accomplished many small-scale energy efficiency

projects, making measurable reductions through bond initiatives, utility audit rebates, and an energy revolving fund that started at \$175,000.

The university's current climate action plan calls for achieving carbon neutrality by 2025, including 100 percent mitigation for campus electricity by 2015. To meet next year's target, the university is purchasing renewable energy credits (RECs), mostly originating from local hydroelectric facilities, and will likely also purchase a small amount of carbon offsets, says UVM Sustainability Director Gioia Thompson.

Unlike the growing number of states with renewable portfolio standards, purchasing renewable energy credits through UVM's local utility was not automatically an option until the university asked the state for special permission. Since a reliable renewable energy market doesn't yet exist for Vermont customers, UVM's decision to buy RECs will raise questions in the community, says Thompson—though raising questions is part of the mission of the university, she adds.

In addition to reducing energy consumption and transitioning from fossil fuels to local renewable energy sources, UVM's mitigation strategies include finding ways to engage energy and carbon markets as a way to move the conversation forward—externally and internally. As more energy options become available and are more widely understood, the university community can be consulted about how best to engage with these nascent markets, says Thompson.

CREATIVE FINANCING

How to pay for carbon mitigation and the range of initiatives and strategies it entails has posed a challenge for many colleges and universities. It has also pushed higher education institutions to find creative ways to sustain their spending. A primary goal for Colby College has been to make sustainability part of the college's regular course of business.

"We used a mix of debt financing and internally generated funds for construction of the biomass plant and numerous energy conservation measures. Instead of creating a separate revolving loan or dedicated project fund, we've chosen to fund initiatives through our regular operating and capital budgets," says Terp. "This shows sustainability is a priority, and our budget process reinforces that message." In selecting initiatives, the college typically employs an eight-year payback analysis to assess project feasibility.

While Luther College doesn't have a formal revolving loan fund per se, the college allocated the annual energy savings of \$250,000 from its \$1.5 million energy audit project to establish a climate action fund, explains Tacke. "Essentially anything we save in energy costs goes back to this fund to allow us to invest in the next round of projects and utility studies."

Funding strategies for Portland State include a newly established green revolving fund to finance and prioritize energy efficiency projects across the campus. With an initial investment of \$500,000 from the state, requirements include a 10-year payback on projects that must focus not only on energy efficiency but also on improving facility conditions.

ASU's Sustainability Initiatives Revolving Fund (SIRF), launched in 2010, provides three levels of investment support for campus projects:

- Micro grants of up to \$5,000 are designed to promote student engagement and build a campus sustainability culture.
- Fund matching and efficiency loans provide medium-scale support for capital improvement initiatives such as space and equipment upgrades that improve energy efficiency and reduce emissions. These loans require a six-year payback and match funding from the participating department, which then also shares in any returns generated.
- Capital expansion loans provide multimillion-dollar support for large-scale initiatives that will make a significant and measurable impact on reducing carbon emissions. These loans must return project costs within 10 years.

At the University of Vermont, the potential for saving energy and reducing emissions got a substantial boost with the launch of UVM's \$13 million energy revolving fund in 2012. The \$13 million represents less than 10 percent of the total cash on hand UVM typically has at its disposal from financial reserves, explains Thompson. The two major criteria for project eligibility are a payback period of no more than seven years and an outlay of \$3 million or less.

The UVM working group established to plan and implement the fund's projects consists of staff from the physical plant, facilities design and construction, campus planning, and capital planning and management. Projects to date have included installing demand-controlled ventilation systems in buildings, replacing external lighting across campus with energy-efficient LED fixtures, and upgrading ventilation and lighting controls in older facilities.

2 BUILDINGS

Now using geothermal heating and cooling, with systems designed and ready for five residence halls

Pacific Lutheran University,
Washington

"Options exist for every institution in every part of the country to create revenue streams for paying off smaller-scale obligations in relatively short periods of time," notes Hales of Second Nature. The greater challenge is in the area of debt financing for those bigger, longer-term payback projects that would significantly reduce cost and emissions, he adds. "Most colleges and universities are very concerned about accepting new debt, and boards and CFOs also have to weigh the financial risks if those projects don't perform."

Because of the work of some larger research universities that have tackled deep energy efficiency projects in their labs and elsewhere on campus, investors know the potential for a guaranteed return on investment from those big energy-saving projects, says Hales. They also know that colleges and universities represent long-term stable partners, he adds.

Second Nature is currently piloting a financial model that would bring together the money from investors who are looking for good projects with institutions looking for investors, in a way that would not count against the debt capacity of the institution and that would remove the risk of financial nonperformance, explains Hales. If successful, this effort could go a long way in addressing the very real roadblocks that CFOs, presidents, and boards face related to major long-term energy project financing.

LASTING IMPACT

"As CBOs we are in a relatively unique position to advance matters of priority to the institution," says Olsen. "Because of our intersection between operational and financial functions, if there is something we identify as important, we can serve as connectors." At ASU, there isn't a big gap between theory and practice when it comes to sustainability, he notes. "Those responsible for the operations of the institution are sitting next to those whose job it is to come up with new ideas and evaluate those ideas. And when you're sitting together, it's a shorter trip from idea to implementation."

Similarly, as leading developers and disseminators of new knowledge, the nation's universities have a role to play in helping individuals and communities understand these complex energy issues and in developing potential solutions, asserts Olsen. "On the research front, one of the things we can contribute is the training of millions of people we educate every year to become leaders of tomorrow. While in some respects higher education has a small physical footprint compared to the rest of world, from an environmental standpoint we have an outsized ability to have positive impact through our education mission."

Regarding carbon neutrality pursuits, PSU's Rimai would only caution not to put form over substance. "A plan is important because it requires ongoing measurement and testing to make sure you are moving the needle. The tendency, however, could be that an institution

becomes so focused on the pretty bar graphs that show your progress that you ignore what's at the core of being an institution of higher learning," she asserts.

"I firmly believe our best measure of success when it comes to sustainability is that we are encouraging lifelong learners around sustainability in the broadest sense. This has been a core value embedded at Portland State from our beginning. You can't come here and not be impacted by sustainability-related learning."

\$13 MILLION

Energy revolving fund to support projects that save energy and reduce emissions

University of Vermont

PUTTING CARBON IN CONTEXT

Sustainability has long been a core value for Lane Community College, Eugene, Oregon—permeating the academic, operational, and outreach efforts of the institution. Within the past decade, Lane has launched two-year degree programs in renewable energy technology, resource conservation management, sustainability coordination, water conservation technology, and watershed management, and added a building controls technician emphasis to its energy management degree.

Through Lane's Institute for Sustainable Practices, the college operates a recycling education center, administers a revolving loan fund for energy conservation and renewable energy projects, and offers a green office certification training program for campus departments, among other efforts. A prime example of Lane's attempts to give students a firsthand sensibility about sustainability is the college's learning garden, a student-led initiative that grows healthy organic food for the campus community while providing learning, service, and leadership opportunities for students.

That's not to say Lane doesn't have its share of carbon-related concerns. Transportation remains the college's biggest greenhouse gas emissions challenge, notes President Mary Spilde. "Our campus is about four miles outside of town, and the only way to access it is on roads without dedicated bike lanes."

Lane is working to get more carbon-neutral and rapid transit solutions in place, but realistically it will likely be 2020 before the college sees any significant movement on this front, says Spilde. While pledging to become carbon neutral has helped Lane focus its carbon-reduction efforts and establish a course for neutrality, it hasn't necessarily compelled the campus to do anything dramatically different. That's because at Lane, carbon is put in context with everything else.

Lane's latest effort to link education, ecology, economy, and community is still in the early stages of development. The college wants to build up its culinary arts and hospitality management programming while providing economic and health benefits to the larger region. Lane already supports local and organic food production through its campus dining services.

Now the college wants to help generate entrepreneurial opportunities for small businesses. The college's foundation is in the process of raising money to establish a regional institute that will not only educate chefs but will connect farmers and product developers to form a food cluster centered on the bounty of the Willamette Valley that will in turn drive local economic health and vitality, says Spilde.

"It's easy to get overwhelmed with the largeness of a problem like climate change," she notes, adding that it helps to define your response within your own sphere of influence and to engage where and how you can. Lane's approach of integrating social, environmental, economic, and learning practices provides a framework for engaging

LEARNING GARDEN

Student-led initiative grows organic food for the campus community

Lane Community College, Oregon

students and the larger community to think about how to solve big challenges, says Spilde. "When you view climate change not only as an environmental concern but also as an economic problem and a social justice issue, you begin to formulate actions that allow you to take quantum leaps faster and with greater collective impact."

In that regard, for institutions committed to carbon neutrality, the destination remains essential, but perhaps no more important than the journey.

KARLA HIGNITE, Ogden, Utah, is a contributing editor for *Business Officer*.

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SHARE YOUR RIDE

Since investment in campus renewal and sustainability became codified in the strategic plan for Montgomery County Community College, Blue Bell, Pennsylvania, and was endorsed by its president and board in 2005, MCCC's climate commitment advisory council has developed annual action plans, monitored plan implementation, and set short- and long-term goals. As is the case for many commuter colleges, transit-related emissions are a primary source of MCCC's carbon footprint. To that end, the college is employing a variety of transportation strategies to reduce those impacts.

- o In 2010 the Pennsylvania college began operating a compressed natural gas shuttle between its Blue Bell and Pottstown campuses—about 30 miles apart—thereby reducing commuter traffic by upwards of 4,000 miles each day and an estimated 522,000-plus miles annually. A planned expansion for 2015 includes a route that will connect the shuttle to a local train station, and a bus stop on campus that will connect routes between various suburbs.
- o MCCC has also partnered with the rideshare service Zimride to promote and encourage carpooling among students, faculty, and staff—logging more than 1.2 million carpool miles since 2011.
- o In addition to electric hybrid vehicles for public safety and facilities staff, the college instituted a Segway personal transport program for its public safety officers. A 185-space "green lot" at MCCC's Blue Bell campus is reserved for drivers of electric, hybrid, and conventional vehicles that average 25 MPG or greater, as well as carpoolers and shuttle riders. "While these examples represent some of the smaller stuff we're doing at the margins, you have to continue to find creative ways to reduce your carbon footprint, no matter how small the impact," says Thomas Freitag, the college's vice president for finance and administration.
- o Beyond transportation concerns, the college is addressing facilities-related emissions in several key ways, including a guaranteed energy services agreement set to reduce energy consumption by 19 percent over 15 years. As of 2011, the college has purchased 100 percent of its electricity from renewable sources. Waste reduction—another core focus for the college—got a boost with the opening of MCCC's Culinary Arts Institute in August 2013. The designated "landfill-free enterprise" recycles and repurposes 100 percent of its waste stream, including conversion of food scraps into agricultural compost or combustible solid waste to burn as energy.

Support from the college president as well as from faculty and staff have been key to MCCC's successful efforts to reduce the college's carbon footprint, stresses Freitag. "My role as CBO is to make it all work with the money we have," he adds. "Wherever possible, we try to leverage relationships to help fund our initiatives." Currently the college is seeking partnerships for a variety of energy projects, including upgrading outdoor lighting.

Even so, providing a benefit like the free shuttle between campuses is not without cost, argues Freitag. "This transit solution required resources that we are tempted to use elsewhere. By making the decision to do this, we are not only providing a service to students and faculty and staff but are also sending the message that this kind of commitment to sustainability requires a commitment of resources." Where institution resources are spent, most projects are financed from the college's operating budget. This makes it very clear the priority the college has placed on reducing its carbon impact, notes Freitag.

All these efforts, big and small, are paying off. MCCC's most recent measurement of overall emissions revealed a 63 percent decrease from 2007 to 2013.

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COMING SOON TO YOUR INBOX: KEY FACILITIES METRICS SURVEY

To improve the knowledge base of higher education finance and facilities leaders, NACUBO and APPA have developed a Key Facilities Metrics Survey to capture critical facilities measures that every finance and business officer should know. The joint survey—being sent to all NACUBO and APPA members—will help leaders establish an internal trend line for better understanding how their facilities stack up on key financial and environmental benchmarking measures.

NACUBO's Sustainability Advisory Panel provided input on the survey—a set of five simple questions that relate to energy efficiency, water consumption, and waste streams. The aim of this survey is to align the business office to track basic facilities data on an annual basis, the thinking being that where measurements occur, improvements are more likely to follow.

The Key Facilities Metrics Survey will complement APPA's more in-depth annual Facilities Performance Indicators Survey of colleges, universities, K–12 organizations, and other educational entities (see www.appa.org/Research/fpi/index.cfm). The FPI captures more than 50 core elements of successful facilities management and produces the only report readily available on the costs and practices of facilities operations at educational institutions. The FPI allows extensive comparisons of average costs for different types of space and institutions and empowers campus leaders with the vital data and reporting tools needed to measure operations and performance, identify capital asset realities, and lead a successful facilities strategy that supports the institution's mission.

Look for the Key Facilities Metrics Survey in your inbox as of July 1, 2014.

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