UI making concerted effort to conserve energy

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It's midafternoon on a brilliant, sunny day. Natural light shines through the glass stairwell of a campus garage. Wall lights also brighten the path for people.

It's 2 a.m., and the lights in offices and hallways of a campus research building send a glow onto the street below. The air conditioning hums.

At a time when the University of Illinois' annual power bill has reached a hefty $50 million, new buildings continue to expand the university's power consumption, and students and faculty are as plugged-in as ever, a comprehensive effort is under way to address issues such as energy conservation, waste reduction and cutting carbon emissions on campus.

In other words, people want to make the university a whole lot greener.

Photo by: Robin Scholz

Campus sustainability coordinator Matt Malten stands at the new business instructional facility site at Gregory and Sixth streets, a facility the UI is constructing as a 'green' building.

"We expend energy on things completely unnecessary. And we also have inefficient systems," said William Sullivan, faculty member with the Department of Natural Resources and Environmental Sciences and director of the campus Environmental Council.

The university, he said, needs to "find ways to conserve energy, decrease waste and increase efficiency.

"I think we need to begin looking very carefully at how we use resources. In some ways, we've already started," Sullivan said, referring to an energy task force chaired by Provost Linda Katehi and several other notable projects.

A new rain garden captures and filters water runoff. A handful of electric cars zip around campus. Next semester, students will collect old vegetable oil from campus dining halls and turn it into biodiesel. A tank of E85 (85 percent ethanol, 15 percent gasoline) will be installed at the campus garage by the fall. Next year, three wind turbines will dot the southern horizon.

The significance of all this activity, including the task force, "is we are really starting to put together some holistic plans on sustainability issues in general, with energy use being a component of that," said Matt Malten, the UI's sustainability coordinator.

Members of Katehi's task force are analyzing energy use and working on a comprehensive energy policy for the university. As part of that effort, the UI is hiring a consulting firm to help come up with recommendations on how it can address energy issues.

More than a vision statement, the policy document will be "very comprehensive," Katehi said.

It could entail guidelines on how the university will build its buildings – and how it will maintain them – to reduce energy consumption. It could contain guidelines on how people use a variety of things, including lab equipment and laptops.

"It's about behavior and it's about culture. We need to change, and that takes time," she said.

Katehi expects a draft of the policy to be completed around August for the UI trustees to review it at their September meeting.

The UI is not alone in this situation. In response to the growing cost of energy and growing awareness of the consequences of global warming, many

universities around the country, not to mention regular consumers, are rethinking how they use energy.

Energy consumption at a university, however, is quite different from that of a typical consumer's home. Laboratories require adequate, frequent air circulation, particularly those that house animals and ones in which chemicals are used. And a building where supercomputers are humming along shouldn't get too hot.

In addition to crafting a comprehensive energy policy, the university will consider setting goals on reducing carbon emissions in coming years and will set more aggressive goals as the years continue, Katehi said. She is also weighing the benefits of joining organizations such as the Association for the Advancement of Sustainability in Higher Education.

Since several student groups and dozens of faculty members are involved with a variety of green initiatives, Katehi said, she would like to bring all these various groups together in late summer or early fall to talk about how to coordinate their efforts.

A lot's going on.

Money pushes issue

What's partly to thank for that? The tight budget situation.

"It forced us to move very quickly," Katehi said.

Although the university produces power and heat at the UI-owned Abbott Power Plant, it still must buy fossil fuels to generate that electricity. Abbott is capable of running on coal, natural gas or heating oil. In addition to producing its own power, the university can buy it from a utility company, such as AmerenIP.

Rising costs have accelerated the university's plans to address energy issues, but many of the challenges and goals were already being discussed during the strategic planning process, Katehi pointed out.

Back in the 1970s, when the UI's director of energy conservation, Terry Ruprecht, was working at Michigan State, universities faced a spike in energy prices and started to explore ways to reduce consumption and increase efficiency. A lot of those measures started to go by the wayside in the '80s, he said.

"Energy prices softened a bit, and people got used to paying more," Ruprecht said.

In the last three years, prices for natural gas, heating oil and electricity have increased once again.

"That's been a wake-up call for individuals and large institutions like the UI," said Md Rumi Shammin, a postdoctoral research associate with the Environmental Council.

"At the same time, there are other broader, global issues related to energy: global warming, long-term availability of energy," Shammin said.

And these are issues on the minds of many students and faculty.

"The new world order is we are now competing for all our energy with places like China and India, and we never had that competition for raw energy before," Ruprecht said. "That will continue to keep prices high. Plus, regardless of energy source, the U.S. does not have a great deal of the world's supply."

Shammin led an environmental studies class this spring in which students took a comprehensive look at the UI's situation.

They examined six buildings on campus and focused on a variety of themes, such as green building samples, greenhouse gas emissions, energy awareness, electrical use, heating and air-conditioning systems and metering.

They came up with dozens of recommendations for a campus energy policy. Among their many suggestions: Update fluorescent lighting. Prioritize the miscanthus power plant. Stop increasing coal usage. Incorporate energy-related coursework into the general education curriculum.

The students also reviewed an incentive program for departments and units to reduce their energy consumption.

"The easiest way to change behavior is to try assigning responsibility of energy consumption to the units and providing incentives to conserve," Katehi said.

If a university department conserves its energy and doesn't use all the money budgeted to it for energy, it could keep some of the money, she said.

This would be quite a change to the current culture, where space is ostensibly free for university departments or units.

There's a catch to the incentive program. If a unit spends more money on energy than budgeted, it would have to pay more.

"There has to be the carrot and the stick," Sullivan said.

Some change is easy

In addition to providing people with incentives, you have to provide them with feedback and quality data, Sullivan said. For example, once the university starts monitoring energy use, perhaps there could be kiosks or Web sites that show how much energy is being used in a week compared

with the same week last year.

Another thing necessary to create real change is to recognize people for their achievements, Sullivan said.

"There's no one silver bullet for this,"he said. "Instead, there's a need for a multipronged approach to ensure energy use is no longer a free resource on campus."

A lot of things are doable, Ruprecht said, because "our energy efficiency is so poor today. There are innumerable opportunities for saving (energy) on campus. That's not saying they're easy to get at. They require some upfront level of investment," he said.

Some things are easy. For example, the UI has an estimated 50,000 computers on campus.

"If we could get 10,000 computers off at night and off one day on the weekend, the annual savings is between $150,000 to $200,000," Ruprecht said.

Some things require a little more time and money.

Ruprecht is organizing teams made up of engineers, electricians and experts on devices such as temperature controls, who will review the air-handling systems in buildings to check their efficiency.

The teams will actually go into a building and look at all parts of the system and order tune-ups where needed.

The cost for the staffing and the ongoing tune-ups has not been determined, but the amount saved from an efficiently operating system "will more than offset the cost of adding five people," he said.

This is not a project that will be completed in a year. Some buildings might not have had tune-ups in 20 years, he said.

"Since 90 percent of our energy consumed is in 150 buildings and we can only do one to two buildings per month, it's going to take time," Ruprecht said.

Although the rising cost of energy has brought projects to the forefront, green projects, like many other construction projects, are also subject to delays.

Taking time

Pete Varney, who manages the UI's garage and car pool, is helping students with their project to turn waste vegetable oil into biodiesel. He said it's taken some time to reconfigure it and address safety issues.

Students had hoped to be producing by now, "but to produce the biodiesel, which is relatively safe, we do have to use some chemicals that are slightly hazardous, and we need to make provisions for them, make sure they're stored safely," Varney said.

"One of the goals we'd really like to see, and I think it would be terrific if we could do it, is to take the waste from the dining halls, produce biodiesel and then use it in the trucks that deliver the food. ... I think that'd be a perfect circle we'd be closing."

The wind project, which involves building three turbines south of campus on a proposed energy farm, has taken a little longer than some had expected, as well. In 2003, students passed a $2-a-semester clean energy technologies fee, which is helping support the wind turbines and other earth-friendly projects.

"The message is clear. The students find this really important and ... the students are putting their money where their mouths are," Malten said.

The $5.7 million project has gone well, but "a little slower than expected," he said.

The university has now received approval from the Federal Aviation Administration for the chosen site and is starting to review what's needed for the environmental permits. Future steps include hiring a company to build and install the turbines. The good news and not-so-good news is it's a seller's market, Malten said. With the increased demand for turbines, it may take a while for a company to install the turbines here. Malten anticipates the wind turbines will be installed in mid- to late 2008.

Not only did students reapprove the clean energy fee in 2003, but this year, they also approved a $5-a-semester Campus Sustainable Environment fee, which will pay for broader sustainability projects on campus.

About 80 percent of the students who voted approved it.

CONSERVATION MACHINATIONS

A look at some energy-saving or earth-friendly initiatives under way or being considered at the University of Illinois:

Green buildings. All new buildings and major renovation projects, such as Lincoln Hall, will be at a minimum silver certified with the U.S. Green Building Council's Leadership in Energy and Environmental Design rating program. The certification refers to a building meeting certain energy-saving benchmarks set by the council. The College of Business Instructional Facility, currently under construction, will be certified gold under the system, and the new dining hall and residence hall wing project, which begins this summer, will be certified silver.

Wind turbines. The university is planning to install three 1.5-megawatt wind turbines south of campus. All energy produced from the $5.7 million

project, funded by student fees, the Illinois Clean Energy Foundation and the university, will feed directly into the university's electrical system. Campus sustainability coordinator Matt Malten is hoping the turbines will be installed in mid- to late 2008.

System audits. The university has put together teams to review all the air-handling systems in buildings to check their efficiency.

Steam re-trapping. Much of the campus is heated by steam, and there are 21,000 to 24,000 steam traps on campus, according to Terry Ruprecht, the university's director of energy conservation. Staff members are going to check the steam traps to make sure the systems are working properly. If not, a system can lose 60 percent to 80 percent of thermal efficiency if the steam is not allowed to condense in the unit, according to Ruprecht.

Metering. The university is reviewing, replacing and installing meters in buildings (not all buildings have them). The UI is considering eventually converting to electronic meter reading, which will allow staff to process and better analyze data about energy consumption.

Energy service companies. The university is talking with these private entities, which can analyze specific buildings for energy conservation potential. The university would pay the company through the savings it would make from any alterations done to the building to save money.

E85 tank. The garage and car-pool facility off Oak Street will have a new tank of 85 percent ethanol and 15 percent regular unleaded gasoline by the time fall classes start. It will fuel the campus' fleet and any state vehicles that are flex-fuel.

Biodiesel. Students are heading up an effort to convert waste vegetable oil from campus dining halls into biodiesel. They'll set up a production facility at the garage and car pool and will produce about 400 gallons a week.

Rain garden. The university transformed a soggy, muddy lowland area near Allen Hall into a rain garden, planted with native flowers and plants. The project, dedicated this spring, reduces runoff. Plus, native plants, which are more suited to the climate, require less water and maintenance than some other plants. Staff members are considering installing rain gardens elsewhere on campus.

Electric cars. The university has eight small electric vehicles for use on campus. One was recently added to the fleet, but most have been on campus since 2004. They're often used for administrators who need to zip across campus. One of the UI's plumbers uses a trucklike version to drive around campus. The cars won't replace all the university's cars, but they are useful for short, regular trips around campus, said Pete Varney, associate director of the garage and car pool.

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News by Date

« December 2010

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	