

Contact: Steve Maas at 617-566-1348 (home); 617-281-9543 (cell)
Or by e-mail at stevenmaas@verizon.net

Olin College's shrinking carbon footprint

By Steve Maas

To Stephen Durfee, a watt is a terrible thing to waste—or, for that matter, a therm.

With Durfee spearheading the effort, Olin College is on track to saving nearly \$1.5 million in energy costs over the three years ending this July 1.

Olin contracted with Durfee's company, Aramark, in July 2006 to oversee the campus's physical plant, a job previously handled by neighboring Babson College. Durfee brought 20 years of experience that ranged from keeping ice rinks frozen to the environment in science labs pure.

Like detectives, Durfee and his team followed the footprints, the carbon footprints, scouring the five-building campus for energy savings opportunities. "You have to be passionate about this kind of thing if you want to be a success at it," Durfee says. "We've been very aggressive."

They started out by calculating baseline figures for the college's consumption of electricity and natural gas; conducting conditioning tests to see whether equipment performed as advertised; and comparing usage patterns to actual needs. They harvested a lot of low-hanging fruit.

The boiler that supplied water for heating was kept at 195 degrees, when the manufacturer listed 170 degrees as sufficient. The hot water heaters that supplied sinks and showers were set at 165 degrees, when the health code allowed for 140 degrees. The heating system was needlessly kept on during the summer months.

In its first year, Durfee's team reduced Olin's energy footprint by 25 percent. After three years, the annual footprint has shrunk by 40 percent. In other words, during fiscal year 2009, which ends July 1, Olin will have dumped 2,200 fewer tons of carbon into the atmosphere than it did in fiscal year 2006. That's about equal to the carbon emissions of 80 average American households.

The power of rebates

With the help of energy rebates from NSTAR—Durfee goes after rebates with the tenacity of a shopper clipping grocery coupons—the heating system received two key upgrades:

- A combustion control system that constantly samples the boiler flue gas to ensure an optimal mix of natural gas and oxygen. As a result, the fuel burns at 88 percent efficiency, when previously it had been as low as 70 percent.
- Variable speed controls that regulate the amount of water pumped through the central plant boilers. Instead of going full-tilt, the pumps supply only as much water as a particular load requires for its heating needs.

Durfee took a similar approach to the cooling system, installing variable speed drives on the compressor motors. On a hot summer day, air conditioning can account for half the campus's appetite for electricity—and that's at a time when the college is paying peak prices.

Outsmarting the system

Olin College, which opened in 2002, came equipped with a high-tech Direct Digital Control system for heating, cooling, and ventilation. When set on autopilot, Durfee says, "it can run perfectly, but inefficiently." For example, on a warm day, the system would crank up the air conditioning to keep south-facing offices cool, while heating that chilled air to prevent Arctic conditions in north-facing offices.

From his office in the bowels of the Campus Center, Durfee now spends at least an hour a day at his computer manipulating the controls: changing set points for airflow speed, refresh rates, and dampers. He can call up schematics of every floor of every building. They are dotted with "T" symbols, marking each temperature zone (some a single room; others several offices). With a click of his mouse, Durfee can zoom into a virtual version of the box that supplies air to the zone and then make adjustments. He can log on to the system from home, sometimes driving his wife nuts when he responds to, say, students complaining their dorm is too cold.

Someday—perhaps with techniques devised by Olin graduates—the system will be sophisticated enough that Durfee's intervention won't be necessary. But for now, he needs to keep tweaking the system to account for changes in the weather and patterns of building use. Before the winter holidays, for example, staffers were queried about whether they'd be working through the vacations. The heat was programmed to stay up in their offices, while elsewhere temperatures were turned down to 60.

In another example of inefficiency, the automated system regularly replenished the air in the auditorium as if it was always filled with 400 people exhaling carbon dioxide and emanating body heat. In fact, the room sits empty much of the time, so the air was needlessly being cooled or reheated. To solve the problem, Durfee installed a carbon-dioxide sensor that serves as a rough measure of occupancy.

"I've always got to be on top of the stuff," he says. "Every time I miss one, it's another missed opportunity for a couple of therms of gas or a couple of dozen kilowatt hours."

Another opportunity he didn't miss was in the kitchen, where both watts and therms literally went up in smoke with the stove exhaust fans. Now smoke and heat sensors regulate when and how fast the fans operate. That means the fans use less electricity and less air needs to be heated or cooled to replenish what goes out with the exhaust.

One bright bulb

Bill Hunt, used to maintain the controls of the giant cranes that unload ships at the port of Boston. Now, he prowls Olin's halls and offices looking for ways to cut the cost of lighting. Not surprisingly, he is a big fan of compact fluorescent bulbs. A CFL bulb uses 75 percent less energy than a traditional incandescent light and lasts 10 times as long. Hunt is happy to provide free bulbs for the personal fixtures of students and staff. He recently helped students select LED lights, which are even more efficient, to illuminate a community kitchen.

"I'm a fourth or fifth generation Yankee," Hunt says when asked if he'd call himself an energy miser. He programs lights to automatically switch off and installs sensors to turn them on. Room by room, he and his crew are using motion detectors to determine where it would pay to install automated switching.

The cheapest light source of all is 93 million miles away, and Olin is tapping it to cut the cost of illuminating its bi-level dining hall. The interior lights dim as sensors register sunlight streaming through the hall's spacious windows. While ideally diners won't notice any difference, the college will. Called daylight harvesting, the practice is expected to shave \$10,000 a year off the dining area's light bill. An Olin electrician spent a day installing the sensor, which cost \$2,600—\$2,100 of which was covered by an NSTAR rebate.

Student power

Between 8:30 and 9:30 on Saturday evening, March 28, Olin College saw its energy use drop by 30 percent. Students turned off computers, music systems and other personal electric devices; the college switched off all but emergency lights and (benefiting from mild weather) powered down the heating system. It was all in the name of Earth Hour, an annual worldwide event that spotlights the need for climate change.

Olin's participation was spurred on by Tess Edmonds (class of '11), who just four days before had suggested the idea to Durfee. Next year, Edmonds says, students plan a sustainability co-op in a section of one of the dorms. It will, in effect, serve as a lab for piloting ways that students campus-wide could eventually reduce energy consumption.

Earlier this year, students and staff agreed to forgo using trays in the cafeteria. "A couple of people found it a little bit challenging, but in general there's been a huge amount of support," says Edmonds, who noted that the change has not only saved energy and water on the washing end but has reduced food waste as diners can carry only so much at a time.

Also this year, Olin placed second in the Grand Champion category of RecycleMania, a national collegiate competition. It recycled a total of 28,764 pounds of corrugated cardboard, paper, bottles and cans between Jan. 21 and March 28. And this was despite stiff competition from colleges that have full-time staffs detailed to sustainability.

“This year has been a boom year for student involvement” in climate-change matters, says Andrew DeMelia, facilities director. “The first-year students are very focused on sustainability, greenhouses, and composting. They seem to have found our e-mail addresses and offices, which is a very good thing.”

The Class of 2007 established a Green Initiative Fund, through which students can apply for money to pay for sustainability projects on campus. Among them is real-time metering of electricity consumption of each building on campus. Ultimately, by posting the numbers on plasma screens, students will be able to use the power of peer pressure to reduce power consumption.

Students are experimenting with ways to filter the sunlight that can be particularly brutal on some offices and classrooms. Among the ideas are applying film to the windows or attaching adjustable airplane-like wings to south-facing exterior walls.

One of the offices that will serve as a test site belongs to Joanne Kossuth, vice president for Operations. “They really have an activist approach,” Kossuth says of the students. “The best thing we can do for the college is harness that energy.”