

2005 UTK Environmental Progress Report

April 2005 Report to the Office of the Chancellor and the Vice-President for Operations
by the Committee on the Campus Environment

Summary for the Faculty Senate, May 2, 2005

(for the full report, please see www.cce.utk.edu)

Focus: Environmental management on campus

Threefold purpose:

1. To provide a baseline of environmental performance on campus, looking back 20 years where possible.
2. To provide information about environmental stewardship at selected peer universities (UF, UNC-CH, USC, VA Tech).
3. To make recommendations for further progress at UTK.

Data: Quantitative data where possible (mainly from Facilities Services and Environmental Health and Safety). Data were converted to per student and per square feet to enable longitudinal comparisons.

Key findings are as follows ...

Energy Consumption in Buildings

- Total electricity consumption has risen 64% over the past 20 years, due mainly to AC and computers. Other energy consumption has remained fairly constant.
- Coal and natural gas are used at the steam plant – coal is cheaper (especially with rising natural gas costs) but has more air emissions.
- Many improvements have been made to improve the efficiency of the steam plant, air conditioning (through conversion to regional chiller plants), lighting systems, etc.

Air Pollution

- Air pollution comes from stationary sources – notably, the steam plant; from on-road mobile sources (dealt with under Motorized Transportation below); and from off-road mobile sources (dealt with under Landscaping below).
- Emissions at the steam plant have decreased over the past 5 years, due mainly to the increased use of natural gas relative to coal.
- Upgrades to bring the steam plant into compliance with new, more stringent air regulations will cost an estimated \$12 million.

Water and Sewer Usage

- Water usage has been fairly constant over the past 20 years, as has its cost.
- Plumbing fixtures with reduced water demands are being installed in new or retrofitted buildings.
- Waterless urinals are being tried out experimentally.
- UTK has a policy of watering only a few selected landscaped areas on campus.
- The cost for sewer service has risen somewhat in the past two decades and is expected to go up approximately 200% over the next 10 years, due to KUB system upgrades.

Water Pollution

- Water pollution comes from storm water run-off from impermeable surfaces (e.g., roofs, parking lots, roads, sidewalks).

- Of UTK's 556 acres, roughly 58% have impermeable surfaces.
- As UTK has become more built up, its % of paved surface has risen. However, the trend away from surface parking lots has helped to curb this increase.

Solid, Hazardous, and Electronic Waste

- Over the past 10 years, the amount of solid waste sent from UTK to a Class A landfill was halved. This reduction was due mainly to waste diversion to Classes C and D (construction and demolition) landfills.
- The tons of material recycled – paper, plastic, aluminum, cardboards, leaves, etc. – nearly doubled between 2001 and 2004, from 322 tons to 603 tons. Still, recycled waste represents less than 10% of Class A landfilled waste.
- UTK purchases small quantities of hazardous chemicals, mainly through its science, engineering, and other research laboratory work.
- Amounts disposed vary greatly from year to year, and a high amount may be a sign of good management practices, to clean out old chemicals. An aggressive disposal program began in 2000.
- As in many other colleges and universities, UTK “surpluses” its old electronic materials and sells them at public auction. This practice grosses about \$100,000 annually but has a downside: The materials sold at auction may be sent to Asia, where management practices often are unsafe, or the materials may be “parted out,” with much waste ending up in landfills.

Procurement

- Other than guidelines concerning materials such as asbestos, UTK does not have environmental criteria in its procurement policies.

Motorized Transportation (see also accommodations for pedestrians and bicycles)

- According to a fall 2004 survey by the Knoxville Transportation Planning Organization, an estimated 25,000 faculty, staff, and students commute to UTK. Nearly 74% drive alone.
- Only 20% occasionally use Knoxville Area Transit (KAT) to get to campus. Bus passes are \$25/semester.
- UTK contracts its on-campus mass transit operations to KAT. Approximately 60% use this service at least occasionally.
- The survey indicates that saving money and having a guaranteed ride home would be key motivators to using a “Smart Trips” option rather than driving solo.

“Green” Buildings

- The UTK campus has about 220 buildings. Nearly 85% are at least 35 years old.
- UTK is considering seeking “Leadership in Energy and Environmental Design” (LEED) certification for new construction and major renovations.
- When doing equipment replacement, UTK is using energy-efficient lighting and low-flow plumbing fixtures.

Landscaping

- About 160 acres of UTK land are mowed.
- Beginning in fall 2003, UTK began composting or mulching in all of its fall leaf waste.
- Mowing and leaf cleanup services are contracted out. The current contract expires in June 2006.
- Integrated Pest Management controls are used to help minimize chemical controls.

Green Spaces; Accommodations for Pedestrians and Bicycles

- Steps to implement the 2001 Campus Master Plan are making it more pedestrian-friendly and providing new green spaces.

Opportunities for Improvement: In its report, CCE recommends that UTK consider the means listed below to improve the campus environment. Those identified as “short term” could be put in place within, for example, the next three years and continued thereafter. Those identified as longer term may take several years to put in place.

General

1. Create an Environmental Coordinator position within Facilities Services, to coordinate with such areas as Facilities Planning, Development, Parking Services, Dining Services, University Housing, and Environmental Health and Safety.
2. Calculate the “pay-back” periods of “green” equipment and facility designs with relatively low O&M costs, and factor pay-back periods into decisions.
3. Establish an “environmental stewardship fund” to support environmental improvements. This might be funded in part by savings that accrue to UTK from reduced O&M costs (recognizing, however, that the State does not at present fully fund its formula for the university’s utility costs).
4. Make environmental stewardship a selling point when seeking private donations for the University.

Energy consumption in buildings

Short term

1. Continue use of energy-efficient ballasts and lamps in fluorescent fixtures or their components are replaced.
2. Replace incandescent lighting with fluorescent or more energy-efficient lighting.
3. Post “kill-a-watt” signs on light switches.
4. Provide incentives to students to save energy in residence halls.
5. In general, start a more concentrated effort on “energy conservation” behavioral training aimed at students, faculty, staff, and the administration.

Longer term

1. Add motions sensors to lighting for, e.g., rooms, corridors, and parking lots.
2. In general, expand the use of energy management control systems in existing buildings for HVAC and lighting systems.
3. After implementing basic energy improvements that are known to be needed, conduct energy audits to identify further opportunities for energy savings in UTK buildings.
4. Complete conversion to regional chiller plants for air conditioning; explore using geothermal cooling where appropriate.
5. In new construction or renovation, design to maximize the use of natural lighting.
6. In new construction or renovation, use new technologies for energy-efficient lighting as they become financially feasible.
7. In new construction or renovation, design for lower HVAC loads – e.g., by incorporating passive solar and natural ventilation features.
8. Explore the financial and technical feasibility of adding solar PV panels to selected roofs and surface parking areas; encourage UTK and UT/Battelle research on solar panels and other alternative energy technologies; work in collaboration with TVA’s Generation Partners program.

Air pollution

Short term

1. Increase investment in TVA’s Green Power Switch ® program. (While this will not necessarily improve local air quality, it will contribute to regional and national improvements.)
2. Aggressively pursue a “Smart Trips” program for UTK.
3. Continue conversion to biodiesel for service vehicles.
4. Install a dry scrubber at the steam plant to help meet new mercury emissions regulations.
5. Become an air quality leader: Anticipate the need for regulation of carbon dioxide by establishing a task force to explore options for reducing fossil fuel use; also anticipate more stringent nitrogen oxide and PM 2.5 emissions standards.

Longer term

1. Conduct life-cycle analyses of the costs and environmental impacts of energy technologies that could reduce dependence on the fossil-fuel-powered steam plant.

2. Shift the UTK passenger vehicle fleet to hybrid gas/electric vehicles.
3. Explore incorporating passive solar water heating into buildings.
4. Explore the technical and financial feasibility of on-site biodiesel generation from UTK agricultural waste products, with the biodiesel to be used in UTK service vehicles.

Water and sewer usage

Short term

1. Continue to replace old plumbing fixtures with low-flow versions.
2. Continue to evaluate waterless urinals and other water-saving devices.
3. Post signs encouraging water conservation in showers, rest rooms, kitchens, and laboratories.

Longer term

1. Install automatic turn-off faucets.
2. Explore using timers on showers in UTK recreational facilities.
3. Explore reusing “gray water.”

Water pollution

Short term

1. Continue work on sediment control, as has been done recently at the steam plant to divert runoff from the coal storage area.
2. Continue implementation of the Spill Prevention, Control, and Countermeasures (SPCC) plan.
3. Improve management of the riverbank and associated riparian corridor on the UTK farm property west of the Alcoa Highway (“Buck Karns”) Bridge, along the Tennessee River.

Longer term

1. Design new buildings and major renovations to capture storm water run-off for perimeter landscaping.
2. Continue the conversion from surface parking to structured multi-level parking.
3. Where surface parking lots are used, explore using permeable surfaces.
4. Explore “green roof” technologies.
5. Plant floral species active in phyto-remediation to absorb aqueous pollutants present in storm water run-off.

Solid and hazardous waste

Short term

1. Continue to publicize the hierarchy of “reduce, reuse, recycle.”
2. Continue to increase the visibility of UTK’s recycling program, as well as its educational program – in general and as targeted to residence halls.
3. Develop material on recycling that can be included with new faculty and staff orientation.
4. Make reusable dishware an option at all dining facilities.
5. Explore options for recycling additional materials such as electronic equipment, Styrofoam, and ash from the steam plant.
6. Continue to expand special event recycling opportunities.
7. Develop guidelines for ways to minimize the use of hazardous chemicals in laboratories.

Longer term

1. Explore substitutes for individually-bottled water, such as metered “for pay” spring water dispensers.
2. Implement a campus food waste composting program using local composting resources.
3. Implement measures such as recycling in tailgate areas during football games, and the placement of outdoor recycling bins.

Procurement

Short term

1. Require that recycled content paper be used for all printers and copiers.
2. Investigate the “green” procurement practices of other universities.
3. Include “green purchasing” information when campus contract purchasing information is distributed – e.g, information such as “certified wood products should be preferred in procurement practices, all other things being equal.”

4. Make organic and regionally grown food available on campus.
5. Provide access to fair trade certified products (e.g., coffee, bananas, cotton).

Longer term

1. Develop and implement a set of “green” procurement guidelines for UTK.

Motorized transportation (see also accommodations for pedestrians and bicycles)

Short term

1. Aggressively pursue a “Smart Trips” program for UTK.

Longer term

1. Create incentives to reduce the number of solo drives to campus, such as lower-cost parking passes with limited usage.

“Green” buildings

Short term

1. Formally adopt the policy that on all new construction and renovation of major buildings, LEED certification will be sought.
2. Encourage and provide funds for LEED training and certification for UTK employees such as Building Representatives and staff in Facilities Services, Housing, etc.

Longer term

1. Locate and construct new buildings to maximize their use of green siting and building techniques, as well as the feasibility of “smart trips” to and around campus.
2. Retrofit older buildings to meet LEED certification guidelines.

Landscaping

Short term

1. Emphasize using native plant species.
2. In ornamental planting, use drought-resistant species.
3. When renegotiating mowing/leaf cleanup contracts, require that equipment meet strict environmental standards for low noise and low air emissions.
4. Investigate ways to reduce the number of acres mowed.

Longer term

1. Transition to turf and other permeable surfaces that require little or no mowing.

Green spaces; accommodations for pedestrians and bicycles

Short term

1. Establish a task force to plan for improvement of bicycle access throughout the campus, and to work with city government to link campus and off-campus bicycle commuting routes.
2. Continue to expand the network of walkways and outside meeting places on campus.
3. For walkways, use permeable surface material where feasible.
4. Continue new and replacement tree planting.
5. Anticipate global climate change by planting drought-resistant tree species.

Longer term

1. Create a system of dedicated bike trails in the campus area.
2. Create dedicated bicycle lanes on roads, in order to permit safe travel among major destination point throughout the campus and to link with off-campus bicycle commuting routes.