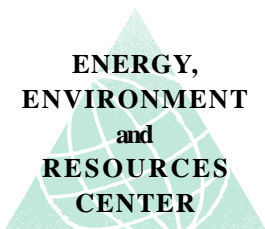


HIGHLIGHTS and INITIATIVES



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Executive Director

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Clean Technologies
Gary A. Davis, Director

Office of Communications
David Brill, Director

Center for Geography and
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Rosalyn McKeown, Director

FORUM for Applied Research
and Public Policy
Dennis McCarthy,
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Sheila Webster, Director

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Donald Alvic, Director

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Tim Gangaware, Assoc. Director

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The EERC conducts unbiased,
analytical, and multidisciplinary
research designed to promote
real-world solutions to problems
in the fields of energy, environ-
ment, technology, and economic
development.

PROJECTS. The National Park Service (NPS) recently engaged Research Ecologist **Jack Ranney** to organize a process and workshop for its Appalachian Highlands and Cumberland-Piedmont network of 19 park units. The July workshop in Great Smoky Mountains National Park brought together more than 35 ecosystem modelers and natural resource specialists to work on aquatic and terrestrial ecosystem models. Since the workshop, **Ranney** has been working with peers to document the models. NPS will use these results to choose reliable indicators, or vital signs, that could provide early warnings of ecological change. Potential major concerns for the 19-park region include air quality, invasive species, adjacent land use, and visitor impacts. Characteristics of biodiversity, water quality, soil qualities, and bioaccumulation of contaminants are likely indicators of ecosystem health in the region.

Student Intern **Sarah Surak**, recent recipient of an East Tennessee Environmental Business Association scholarship administered by EERC affiliate the Waste Management Research and Education Institute, has revitalized recycling efforts on campus. **Surak** conceptualized and led the first waste audit on campus, designed and implemented a recycling program for dorms, and organized volunteers to staff recycling bins. **Surak**, who also serves as president of Students Promoting Environmental Action in Knoxville, is a student member of the Committee on the Campus Environment led by Executive Director **Jack Barkenbus**.

AWARDS. Senior Research Assistant **Ruth Anne Hanahan** and **Tim Gangaware**, associate director of EERC's Water Resources Research Center (WRRC), along with other members of the Upper Tennessee River (Knox County) Adopt-A-Watershed (AAW) Leadership Team, recently attended the 2002-2003 AAW Southeast Regional Leadership Institute as part of a National AAW competitive scholarship award totaling \$18,000. In addition to participating in the eight-day leadership workshop and an upcoming spring retreat, the team will receive on-site training, materials, implementation strategies, and peer coaching throughout the school year. Now in its sixth year of leading Knox County's AAW program with support of the Knox-area Water Quality Forum, WRRC will use this training to strengthen and expand its AAW program.

INTERNATIONAL NEWS. In June, **Rosalyn McKeown**, director of EERC's Center for Geography and Environmental Education, and daughter Kelsey Ice, a student at Oak Ridge High School, made presentations in Chengdu, China, at the International Teenager's Forum on Environmental Protection. The Conference, sponsored by the State Environmental Protection Administration of the People's Republic of China, drew teenage participants from across China and Asia, as well as Australia, Europe, and North America. Kelsey's presentation, "Wind Powered Electrical Generation," was inspired by the Tennessee Valley Authority's wind-turbine pilot project on Buffalo Mountain. **McKeown** spoke on the "Analysis of Environmental Issues." Both presentations were published in the conference proceedings.

Visual Disturbances



Each *Highlights and Initiatives* back page presents an in-depth look at one of EERC's projects or activities. This edition focuses on a recent study to determine environmental impacts associated with the manufacture, use, and disposal of computer monitors.

continued on back ▶

Visual Disturbances

A new study identifies the environmental impacts associated with the manufacture, use, and ultimate disposal of your desktop computer display. • BY ELISE LEQUIRE

“When you include energy from all life-cycle stages, ...the CRT energy drain is about seven times more than that of the LCD.”

WHILE SALES of PCs may be slumping in the U.S. market, flat panel displays are becoming the hot new item for the desktop environment. Flat screens not only look sleek, they also take up less room than cathode-ray tube (CRT) monitors and use less energy than their clunky predecessors.

But what are the *overall* environmental impacts of switching to the liquid-crystal display (LCD) technology that makes your slimmed-down desktop monitor possible? That’s the question a team of researchers at the Center for Clean Products and Clean Technologies (CCPCT)—an arm of the University of Tennessee’s (UT) Energy, Environment Resources Center (EERC)—began to investigate five years ago through a partnership with the U.S. Environmental Protection Agency (EPA) and private industry.

“Manufacturers in Japan and Europe have recently had more regulatory pressure than those in the United States to address some of the environmental concerns, such as electronics takebacks—mandatory recycling by the manufacturer—of the products they produce,” says **Maria Leet Socolof**, a senior research associate at EERC. Many U.S. companies, however, are taking steps toward environmental stewardship on their own.

In addition to final disposal, **Socolof**’s team evaluated energy consumption, which during the use stage is about a third less for the LCD than the CRT. “When you include energy from all life-cycle stages in the equation, however, the CRT energy drain is about seven times more than that of the

LCD,” **Socolof** says. Basically, it takes more energy to make a monitor than it does to use it over its lifetime, primarily from the high energy requirements of glass production.

While chemical toxicity has rarely been addressed in traditional life-cycle analyses, **Socolof**’s team looked closely at several impact categories, including human health and ecotoxicity. Originally concerned about the mercury used in the fluorescent backlights in LCDs, they were surprised to find that the energy required to power CRTs produces toxic emissions of mercury from coal-fired power plants that exceed the amount of mercury contamination estimated in the manufacture and end-of-life stages of LCD monitors.

The report separates various components of environmental impacts—including extraction of materials from the Earth, emissions from energy use, manufacturing impacts, air and water toxicity, and landfilling or recycling—and puts them into impact categories such as global warming, energy use, or public health effects.

This detailed assessment of the complete life-cycle environmental impacts of desktop computer displays may also serve as a model for future research on other electronics technologies. The project was a cooperative venture of the DfE Program in the Economics, Exposure, and Technology Division of EPA’s Office of Pollution Prevention and Toxics; UT’s CCPCT; the electronics industry; and other interested parties, including the Silicon Valley Toxics Coalition. •

For more information, contact Maria Leet Socolof, project manager, CCPCT, University of Tennessee, 311 Conference Center Building, Knoxville, TN 37996-4134, call 865-974-9526, or access the report online at the CCPCT Web site <www.cleanproducts.org> and EPA’s DfE Web site at <www.epa.gov/dfe>.