Energy-Coal (The Appalachian Resources Project)

Large environmental and human health problems have long been associated with the mining of coal. In recent years, surface mining activities have dramatically exacerbated land and water problems in the Appalachian region. This UTEC project (1) identifies and quantifies environmental and other external costs of coal mining; (2) develops engineering techniques to minimize environmental problems associated with coal surface mining; (3) develops mathematical models of water flow and water contamination due to surface mining; (4) simulates the impact of price and policy changes on the supply and demand for coal; (5) carries out cost analyses of alternative experimental techniques for coal surface mining designed to minimize environmental problems; (6) intercompares institutional arrangements (mostly legal and economic) of coal mining in the United States, West Germany, and England; and (7) analyzes comparative costs for alternative advanced reclamation techniques.

Resource Management and Conservation Program

Energy Conservation in Industries. UTEC helps develop productive energy conservation in small and medium industry by directly assisting selected industries to perform internal energy analyses and develop energy management programs tailored to save maximum money and energy. A prime UTEC objective is to assist all users of energy in identifying the most productive prospects for using energy more efficiently in response to higher energy prices and the national need to cut imports.

Regional Solid Waste Energy and Materials Recovery. UTEC assists the Tennessee Valley Authority, the Environmental Protection Agency, and the Federal Energy Administration in a large regional study (several thousand square miles) on the feasibility of collecting and transporting municipal solid waste to a central processing center where combustible materials will be separated, processed, and mixed with coal to fuel electricity generating plants. The noncombustible waste fraction will be processed for secondary materials recovery. UTEC's special interest is the identification of factors which can affect the amount and composition of the waste, such as economic levels, lifestyles, and new packaging technologies.

Technologies for Special Waste Recovery. UTEC works with scientists within the University on a molten salt catalytic converter process which promises to economically convert scrap rubber tires into saleable carbon black, as well as liquid and gaseous fuels. UTEC also assists in organizing information on agricultural and wood waste product utilization, waste oil recovery, and reuse.

Tennessee Energy Conservation in Housing (TECH) Program

TECH is a joint venture among UTEC, the Tennessee Valley Authority and Oak Ridge National Laboratory (Energy Research and Development Administration) to design, construct, test, evaluate, demonstrate, and implement housing that uses an economically minimum amount of external energy (other than sunlight). Two nearly identical residences are to be constructed, each approaching space heating and cooling plus hot water requirements using a different technology. One house, the Annual Cycle Energy System, (ACES), will use an electric heat pump with energy storage in a water reservoir to transfer heat between summer and winter in such a way that the average coefficient of energy performance is much greater than that of conventional heat pumps. The second house (the Solar House) is designed to make maximum benefit of solar thermal energy. Both houses will incorporate optimum insulation design and will be equipped to provide "load-point" management of electrical demand. In addition to research and testing, the facilities will be used in cooperation with industry and consumers to help transfer the successful ideas into the marketplace.

Energy Conservation Education and Information Services

Energy/Environment Resource Materials Center (EERMC)

UTEC provides information services and technical assistance to government agencies, environmental conservation organizations, industries, educators, students, and citizen groups in developing energy programs as the relate to resource utilization, education, conservation, and environmental quality. In order to provide these services, an Energy/Environment Resource Materials Center (EERMC) is maintained which includes a collection of research reports and other documents on energy, environment, and conservation. Examples of documents include: technical research results dealing with many types of energy, environmental problem areas, and energy conservation; state and federal regulations and legislation; education curriculum guides and enrichment material; energy conservation checklists and guides; state environmental education master plans; consumer education materials; energy and environmental education grant proposals; listings of energy/environment games, tapes, and films; and funding sources and other information on unique programs. There is also an expertise referral list composed of persons, firms, organizations, or agencies where a particular resource or capability exists in specific areas of energy, environmental problem solving, research, and conservation. It is designed to help individuals or groups to share information, prevent duplication of conflicting services, pool scarce resources, and initiate more innovative programs.

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The University of Tennessee Environment Center

The University of Tennessee is both a State University and the Land Grant institution of the State of Tennessee with a total enrollment of over 45,000. The educational programs are offered on five primary campuses at Knoxville, Memphis, Martin, Chattanooga, and Nashville. The Knoxville campus also offers programs at Oak Ridge, Tullahoma, Memphis, Kingsport, Jackson, and Chattanooga. The UT Environment Center (UTEC) is located on the main campus of the University in Knoxville and is operated under the joint sponsorship of the Vice Chancellor of Graduate Studies and Research and the Institute of Public Service. Participants in its research efforts are mostly drawn from the Knoxville campus. Its public service programs involve faculty from across the State.

Organization and Functions

UTEC serves as a focal point within the University for interdisciplinary energy and environmental programs. It is an intermediary between clients such as federal, state, and local government research agencies, citizen groups, industrial firms, and University experts. In addition to conducting research and demonstration projects, UTEC plans, organizes, and participates in workshops, forums, seminars, and maintains a special Energy/Environment Resource Materials Center (EERMC). The Center is used to provide technical assistance and information on energy and environmental matters to constituents throughout the University, State, and Nation.

In organizing UTEC, it was recognized that considerable flexibility would be needed in forming groups of experts who could meet the challenge of environmental and energy problems, often on relatively short notice. It was further realized that specific technical problems could best be attacked within existing University units. Consequently, the permanent staff of UTEC is small, allowing the temporary attachment of faculty and staff to the Center as they are required for specific tasks.

UTEC does not grant degrees or offer formal courses at The University of Tennessee. It does provide guidance and support to academic departments in the development of research projects, courses, and course material. Research assistantships are available to graduate students in a variety of disciplinary areas.

In addition to responding to requests for information, UTEC keeps abreast of and participates in the activities of various councils, task forces, and government hearings dealing with environment—and energy— related problems. Information generated by UTEC or made available to the staff through the Center's activities is offered in concise, meaningful form. Materials dealing with energy conservation and environmental education are prepared and disseminated to students, educators, and consumers.

Types of Assistance

UTEC helps with environmental and energy analyses of activities and programs affecting people through their communities, business, industries, and governments. Emphasizing the quality of the human environment, UTEC aids in determining on-site and off-site, short- and long-term environmental costs and benefits. This includes conducting environmental impact assessments, analyzing pollution control costs and solid waste management systems, and reviewing environmental aspects of land use in general. Support services involving a number of UT academic units are also provided to students and educators in planning and developing programs in energy conservation education and related research and services.

Areas of Present Concern

UTEC is deeply concerned with a variety of questions related to energy, including the reduction in demand and the development of energy sources. Emphasizing maintenance of environmental quality and efficiency of energy use for minimizing costs, the Center seeks to help clarify the current and projected energy supply and demand situation. It is important to note that environmental and energy research projects are carried out by other University units, but they usually focus on a single discipline, such as Magnetohydrodynamics, and therefore are not directly related to the UTEC programs discussed in this brochure.

Present work of UTEC focuses in four areas: (1) Energy-Coal (The Appalachian Resources Project); (2) Resource Management Program; (3) Tennessee Energy Conservation in Housing; and (4) Energy Conservation Education and Information Services (which includes the EERMC).