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# Energy Studies

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Editor: Jennifer Evans



## Researchers to Study Electric Vehicles

The City of Austin has been chosen to test drive and evaluate a fleet of electric vehicles, with the help of Center for Energy Studies researchers.

The US Department of Energy (DOE) announced in April that it has chosen the City of Austin as one of nine governmental agencies to participate in the initial round of the first nationwide demonstration program for electric and hybrid vehicles.

Dr. Baxter Womack, UT professor of electrical engineering, worked with city officials in preparing Austin's successful proposal. His electric vehicle research has been supported in part by the center.

Although contracts for the project have not yet been signed, Dr. Womack said that plans call for city personnel to drive and maintain the electric vehicles, while he and one or two graduate students carry out an impact study. The CES researchers will evaluate the problems, benefits, public acceptance, and overall practicality of the battery-powered vehicles.

Austin is an excellent location to test the vehicles, Dr. Womack said, because it is a medium-sized city that combines hilly and flat terrain and a variety of traffic conditions.

The city can expect to receive the fifteen cars, light trucks, and vans before the end of 1979. The vehicles

will be maintained by the city's Vehicle and Equipment Services Department and will require recharging with electricity after traveling 70 or 80 miles. Cost of maintenance cannot accurately be predicted, but a recharge will cost on the order of \$1.50. Initial cost per vehicle will be \$8,000 to \$10,000, with DOE paying 80 percent of the total.

The vehicles will be manufactured by private firms and will be chosen from a list meeting minimum DOE performance standards.

The purpose of the four-year demonstration program is to identify practical uses and potential markets for electric and hybrid (combination electric-internal combustion or other power source) vehicles.

Electric vehicles share an environmental advantage over conventional vehicles powered by internal combustion engines: they are much quieter and they do not emit a stream of exhaust. Automobiles are the nation's largest source of pollution.

Dr. Womack said that electric vehicles are potentially competitive with conventional vehicles in terms of overall cost and the costs will come down even further with continued research and development.

And unlike owners of conventional automobiles, those who own electric vehicles do not have to worry about rising gasoline prices, long lines at the pumps, gasoline allocation plans, or gasoline shortages.

# CES Update

## Office of Director

The General Electric Foundation has awarded a one-year grant of \$15,000 to the Center for Energy Studies for policy studies and educational activities.

Dr. John G. Ekerdt, assistant professor of chemical engineering, has begun a project to learn more about the products that can be derived through the **Fischer-Tropsch process** of gasifying coal.

The project will focus on the effects of the synthesis variables on the distribution of surface intermediates over oxide-supported metal catalysts. It is supported in part by the Center for Energy Studies.

A preliminary study of **industrial furnace design** has been funded by the Office of the Director.

Dr. John Howell, UT professor of mechanical engineering, will tour a number of furnace design and manufacturing companies to survey recent design development.

Design methods for industrial furnaces have not changed a great deal since the 1920s, Dr. Howell said. The focus of this project is on applying modern computer simulation techniques to the radiation heat transfer process within furnaces.

**Dr. H. H. Woodson**, director of the Center for Energy Studies, has been appointed to a five-member design review team created by Texas Utilities. The group will review the design of the Comanche Peak nuclear power plant near Dallas in light of the Three Mile Island plant accident.

## Environmental

Technical papers are being solicited for a conference on **Air Quality Management in the Electric Power Industry** to be held January 22-25, 1980, in Austin, Texas.

The conference will be cosponsored by the Center for Energy Studies, the Electric Reliability Council of Texas (ERCOT), the Southwest Section of the Air Pollution Control Association, the Texas Air Control Board, Radian Corpora-

tion, and Apollo Chemical Corporation.

For further information contact the program chairman of the conference, Dr. Hal B. H. Cooper, Jr., director of the Environmental Studies Division, Center for Energy Studies, ENS 143, The University of Texas at Austin, Austin, Texas 78712 (512/471-4946).

## Services

The Center for Energy Studies unveiled June 12 a **multiscreen slide show on energy** produced by radio-television-film graduate student John Smithers.

Entitled "Energy Outlook," the production looks at the nation's traditional sources of energy, at potential future sources, and at three public policy issues that are central to the energy crisis.

Producer Smithers said he undertook the show as a thesis project because he felt the medium and the subject were suited to each other.

"Multi-image slide production excels as an educational medium. It is suited for a complex subject like energy, because through it you can convey complex information in an easy-to-comprehend form," he said. "You can speed up [the presentation of information] to the speed of the human mind."

"Energy Outlook" contains more than 500 color slides and incorporates electronic synthesizer music, bluegrass, jazz, and a variety of sound effects. The thirty-minute, automated show is designed to be viewed in a special multimedia theater called The Egg, located in the Communication Building on the UT campus.

Mr. Smithers produced the show under the supervision of Dr. Robert Brooks, RTF professor, and with the assistance of RTF graduate student Nicki Noe. Jennifer Evans, of the Center for Energy Studies Services Division, wrote the script, and the center funded the project.

Several screenings of the slide show this summer will be open to the public. For information on the schedule, contact Ms. Evans. A second version of the show will be created in a one-screen format that can be shown outside of the multimedia theater.

The Center for Energy Studies and the University of Texas Press

are developing an **educational tape library on energy**.

The tape library will be marketed as a hotline or a telephone access service throughout the nation as a way to educate consumers about energy-related topics in a convenient and personal manner. A user will be able to call a local telephone number, request a tape on a topic of his or her choice, and listen to it.

D. Cheryl Wilkins, director of the Services Division, assisted in planning the development of the tape library. Center for Energy Studies researchers are writing the scripts to be used in the tapes. Topics include the major traditional and nontraditional sources of energy, current energy-related public policy issues, and energy conservation strategies.

Similar tape libraries exist for providing health, legal, and financial information, as well as psychological counseling. Teletronix Information Systems of California will produce the hardware and will market the energy tape library.

## Science Teachers Hear Center Researchers

More than **forty secondary school science teachers** toured a lignite power plant, a nuclear reactor, and a uranium mine and listened to a lineup of UT energy experts in a short course held June 10-22 at The University of Texas at Austin.

Coordinators of the course, "Electric Power and the Environment," were Dr. Dale Klein, director of the Nuclear Division, and Danny Smith, nuclear engineering graduate student.

The science teachers heard lectures from several Center for Energy Studies researchers, including Dr. Klein; Dr. Herbert H. Woodson, center director; Dr. E. Linn Draper, Jr., former Nuclear Division director; Dr. Jerold Jones, Conservation Division director; Dr. Gary Vliet, Solar Studies Division director; Dr. Hal B. H. Cooper, Jr., Environmental Studies Division director; and Mr. John B. Cornwell, geothermal research associate.

The purpose of the course, now in its seventh year, is to enable science teachers to teach energy more effectively. It is sponsored by private Texas electric utilities.

# Cutting a \$50 Million Energy Bill

University of Texas System planners and engineers have embarked upon a project to save millions of dollars' worth of energy over the next ten years in the system's thirteen academic campuses and health institutions spread throughout Texas.

The goal is simple: cut down the energy bill of the UT System 12 to 13 percent by mid-1981 by making its buildings more energy efficient. But the task is immense: that annual energy bill is on the order of \$50 million, and the buildings number more than 850, adding up to 28.2 million gross square feet.

Not only is the task immense, but it is made harder by two more factors: The buildings vary in age from nearly a century old to brand new, and they reflect nearly a century's span of differing architectural notions about air conditioning, insulation, and lighting. The second problem is that many of the easiest, most effective measures to save energy have already been accomplished by the physical plant staffs of the campuses since the Arab oil crisis of 1973-74.

The system planners are approaching the gargantua with a three-stage strategy: look at what has been done elsewhere, develop a plan, and carry it out. And they are already in stage three.

Mr. Herk Emig, assistant to the director of the Facilities Planning and Construction Division, explained how the energy management plan evolved.

"Since the Arab oil crisis, we've been more aware of the need to conserve energy. Title III of the National Energy Conservation Policy Act is a good opportunity for us, and in anticipation of this grant program, the system has been able to develop its own draft plan," he said.

Signed into law last November,

the act will soon make available grants for conducting energy audits to schools, hospitals, local governments, and public care institutions. It will also provide funds for engineering analyses and retrofit measures. The grants will be awarded on a competitive basis and will require the institutions to pledge 50 percent in matching funds. The program is handled in Texas by the Governor's Office of Energy Resources.

In developing the UT System's draft Energy Management Plan, the system planners worked with five engineering firms: Hammer Consulting Engineers, Inc.; William E. Wallis & Associates; Love, Friberg & Associates; Lockwood, Andrews & Newnam, Inc.; and Goetting & Associates.

The plan they developed was evidently an excellent one, because many elements of the UT plan, such as energy audit forms and procedures, appear in modified form in the state's *Energy Conservation Grants Program Training Manual*.

Mr. Duane Keeran, GOER coordinator of educational program, said the UT contribution was important. Mr. Emig was modest: "Well, we just felt they shouldn't have to reinvent the wheel."

The planners have already identified certain types of energy conservation measures they think will be most effective in the buildings of the UT System, many of which are classroom-office buildings.

• *Heating, ventilating, and air conditioning (HVAC)*—The heating, cooling, and ventilating of a building typically accounts for a majority of its energy use, so HVAC is the number one target. Better automatic controls and better monitoring systems are being considered. In the

large ventilation units of kitchens and labs, dampers can be installed to reduce air leakage when the rooms are not in use.

A particularly effective approach to HVAC retrofit is to re-engineer the system so that it will shut off when it is not needed. For example, classrooms, which stand empty about half the day, do not need to be heated and cooled around the clock. A building's HVAC system can be set up to be adjustable to the preferences and habits of its occupants, shutting off when the occupants are absent.

• *Lighting*—Lighting levels appropriate for a room's original use may be unnecessarily high if the use later changes. Reevaluation can eliminate unneeded lights. More efficient bulbs, tubes, and lighting control devices frequently can be substituted.

• *Cogeneration, solar, and other alternative technologies*—Cogeneration systems might be a possibility at the campuses' central plants, and solar energy, particularly passive measures, will be considered, Mr. Emig said, but the applications will probably be limited.

Will the occupants of the buildings be required by the plan to swelter in the summer and shiver in the winter? Not at all, said Mr. Emig. The plan focuses on energy conservation measures that can be accomplished without seriously affecting the comfort levels within the buildings. However, if a federal or state law mandates certain thermostat settings in public buildings, the UT System would have to try to comply with the law, he said. But until that time, The University of Texas System is going ahead with its own plan to conserve energy and save money.

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## **CES Publications**

### **Financing the Future Growth of the Electric Power Industry**

by Martin L. Baughman and Dilip P. Kamat, September 1978, 91 pages, (UT/CES-PS-5).

Electricity is a capital-intensive commodity. The electric power industry will probably require even more capital investment in the future to keep pace with the growing demand for electricity. It is entirely possible that a future shortage of capital could occur, eventually bringing on a shortage of electric capacity.

This report analyzes how such a shortage could come about and how it would be affected by different regulatory reforms. The analysis is carried out by use of a regionalized engineering econometric simulation model of US electricity supply and demand (the REM model) developed by the authors.

One significant finding of the study is that two measures would be most effective in reducing a capital shortfall: (1) allowing electric utilities to include construction work in progress in their rate bases, and (2) allowing utilities' rate of return to rise. Two other measures were shown to be much less effective, in fact, counterproductive: (1) increasing the utilities' investment tax credit and (2) allowing preferred stock dividends to be expensed.

(Dr. Baughman is director of the

center's Electric Power Division and Mr. Kamat is a former center research associate.)

### **Planning for North Sea Oil: The U.K. Experience**

by Ian R. Manners, December 1978, 268 pages (UT/CES-PS-6).

The development of North Sea oil, detailed in this report, holds some lessons of avoidance for the United States in its future plans for developing the oil reserves that lie off its own eastern shores.

The United Kingdom's recent offshore development seems to have occurred swiftly but without controversial social or environmental costs, or even major opposition. This impression of apparent success, however, is due in large part to a lack of opportunity for public involvement in the planning process and a lack of formal social and environmental impact assessment within the planning framework, the study concludes.

The major part of the report focuses on how British regulatory and land use policies have affected the pace and character of North Sea oil development. The government was clearly unprepared for the onslaught of problems, plans, and decisions brought on by the onshore impact of North Sea activity. But a major restructuring and eventually a

marked improvement in the quality of planning initiatives have occurred at both the local and national levels. One clear lesson is that, in the absence of a firm stance by planning authorities, companies involved in offshore development are unlikely to give high priority to community needs.

The UK experience is an example of a nation as a whole receiving many benefits, but the local communities bearing a disproportionate burden of the costs.

(Dr. Manners is an associate professor of geography and a native of the United Kingdom.)

**To order Center for Energy Studies publications**, contact the National Technical Information Service, P.O. Box 1552, Springfield, Virginia 22151 (703/557-4650).

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