Approved February 2, 1983
Date

MINUTES OF THE House COMMITTEE ON Energy and Natural Resources.

The meeting was called to order by Representative David J. Heinemann at
Chairperson

3:30 ~~a.m.~~/p.m. on January 11, 1983 in room 519-S of the Capitol.

All members were present except:

Committee staff present:

Ramon Powers, Research Department
Theresa Kiernan, Revisor of Statutes' Office
La Nelle Frey, Secretary to the Committee

Conferees appearing before the committee:

Chairman Heinemann called the first meeting of the House Energy and Natural Resources Committee to order at 3:30 p.m. In Chairman Heinemann's opening statement to committee members, he welcomed members to the committee saying they could look forward to a very interesting and informative session regarding energy and natural resources issues. He also encouraged each member to apprise him of their preference of which of the two subcommittees they wished to serve on--Energy or Natural Resources.

Chairman Heinemann introduced Committee Vice-chairmen Representative Keith Farrar and Representative Ron Fox, ranking minority committee member Representative Anita Niles, and members of the committee staff. He then called on Ramon Powers, Research Department, to present the agenda topics for the committee meeting.

Mr. Powers, in turn, introduced Julian Efird of the Research Department, who presented a staff review of the Kansas Energy Office (see attachment 1). A brief question and answer period followed the presentation.

Mr. Powers then presented a staff review of Interim Study Proposal No. 26--Coordination of State Program Related to Interstate and Interbasin Water Issues (see Report on Kansas Legislation Interim Studies to the 1983 Legislature). He also reviewed a report on Proposal No. 37--Mineral Leases on Federal- and State-owned Lands (see ibid). A brief question and answer period followed his presentations.

There being no further business before the committee, the meeting adjourned at 4:15 p.m.

The next meeting of the committee will be held at 3:30 p.m. on January 12, 1983.

Rep. David J. Heinemann, Chairman

Date January 11, 1983

GUESTS

HOUSE ENERGY AND NATURAL RESOURCES COMMITTEE

NAME	ADDRESS	ORGANIZATION
Ed Reinert	Topeka	League Women Voters →
Roland Wiebe	710 W. 7th	Kansas Natural Resource Council
TERRY L. OLIVER		EMPIRE DISTRICT ELECTRIC CO
LON STANTON	TOPEKA	KANSAS POWER & LIGHT
ROSS MARTIN	TOPEKA	KS PETROLEUM COUNCIL
JERRY CONRAD	TOPEKA	K G & E
D. WAYNE ZIMMERMAN	TOPEKA	THE ELECTRIC CO's ASSOC. OF KS.
[illegible]	Lawrence	Committee Intern
LAURA EALER	TOPEKA	BUDGET DIVISION
SCOT WRIGHTON	WICHITA	CITY of WICHITA
John Blythe	Manhattan	KS Farm Bureau
TRAVIS TAYLOR	TOPEKA	KS Energy Office

MEMORANDUM

January 10, 1983

TO: House Committee on Energy and Natural Resources

FROM: Kansas Legislative Research Department

RE: Review of the Kansas Energy Office

The Kansas Energy Office (KEO) is scheduled for termination pursuant to the Sunset Law on July 1, 1983, unless the 1983 Legislature acts to reestablish the agency. The agency entered its phaseout period July 1, 1982, after the 1982 Legislature took no action to continue the KEO in existence.

General Background

The KEO was established by 1978 Senate Substitute for H.B. 2973 as an independent agency. Prior to FY 1979, the KEO had been part of the Governor's Department since April, 1975 when 1975 S.B. 13 created the KEO by transferring the duties and functions of the State Mandatory Fuel Allocation Office from the Department of Economic Development. That office had been authorized by the State Finance Council in November, 1973 in response to federal initiatives.

Prior to the establishment of the KEO as an independent agency, the budget and staffing of energy-related agencies had been less than $150,000 and 6.0 F.T.E. positions. Beginning in FY 1979, significant federal funds began flowing to the newly-independent agency. Approved budgets, actual expenditures and staffing are summarized in the following table:

	Approved Budget		Actual Expenditures		
	All Funds	State Funds	All Funds	State Funds	Staff
FY 1979	$ 791,880	$115,468	$ 474,116	$115,391	12.5
FY 1980	1,979,456	182,096	1,645,838	180,826	21.5
FY 1981	2,134,950	347,586	1,416,176	320,064	25.0
FY 1982	1,223,659	264,784	1,140,133	235,224	16.0
FY 1983	1,560,109	90,660	--	--	6.0

The tabular data show that until FY 1981 the approved budgeted expenditures increased dramatically each year, but actual expenditures increased at a lesser rate. Underspending of federal funds was about $300,000 in FY 1979 and FY 1980, then exceeded $700,000 in FY 1981. Over $800,000 in carryover from FY 1982 provides a portion of federal financing for the FY 1983 approved budget. The 1982 Legislature reduced the FY 1982 approved budget to ensure a large carryover amount would be available for the weatherization program.

During the 1981 Session a bill to abolish the KEO was introduced by the Senate Ways and Means Committee, passed the Senate, and died in the House Energy and Natural Resources Committee. Late in the 1981 Session a Conference Committee added the KEO to a list of state agencies scheduled for abolition under the new Kansas Sunset Law which was amended into 1981 S.B. 107. The agency was scheduled to be abolished July 1, 1982, with a one-year phaseout period allowed unless the Legislature acts to reestablish the agency.

1982 Legislative Developments

The Governor proposed to the 1982 Session Executive Reorganization Order No. 19 which would have abolished the agency on July 1, 1982, and transferred certain functions to a new Division of Energy Analysis in the Department of Administration for FY 1983. The Governor recommended expenditures of $1,495,159, including $321,362 in state funds, and 10.0 F.T.E. positions in FY 1983 for the reorganized energy programs.

The Senate in S.C.R. 1850 rejected the Governor's ERO No. 19. The Legislative Division of Post Audit completed a performance audit of the agency and the report was made available to the 1982 Legislature. The House Committee on Governmental Organization and the Senate Committee on Energy and Natural Resources reviewed the Governor's proposal and other matters relative to the Kansas Energy Office. After review by the Ways and Means Committees, House Substitute for S.B. 895 was enacted to provide FY 1983 operating expenditures for the agency and staffing of 6.0 F.T.E. positions. The 1982 Legislature took no action to continue or reestablish the Kansas Energy Office past its July 1, 1982, abolition date.

The approved FY 1983 budget for the Kansas Energy Office provides operating expenditures of $1,560,109. Approved expenditures include $181,218 for the Kansas Energy Extension Service at Kansas State University; $850,000 for residential energy conservation programs through Kansas State University, with up to $500,000 to perform energy audits of LIEAP households prior to weatherization program improvements; and $78,663 for aid to local units, of which $35,000 is for the city of Winfield. A transfer of $125,000 from federal energy funding provided by NEPCA Title III is authorized to support an institutional buildings conservation program through the Division of Architectural Services. The Governor, as official designating agent for the state, named the Division of Architectural Services as the official NECPA Title III lead agency, replacing the KEO, as of July 1, 1982. Federal funding flows directly to the Division of Architectural Services rather than through the KEO in FY 1983. KEO remains the officially designated agency for receiving other federal funds for energy conservation and extension service.

Current Status of KEO

The 1983 Legislature may wish to consider the future of the Kansas Energy Office since it is in its one-year phaseout period and will terminate all programs and functions on July 1, 1983, unless reauthorized during the upcoming session. The agency has submitted an operating budget for FY 1984 which would fund an independent Kansas Energy Office.

The KEO currently operates as an eight-person (6.0 F.T.E.) office in Topeka as authorized by the 1982 Legislature and contracts for a 14-person (10.9 F.T.E.) office in Manhattan. The FY 1984 (Level C) request would increase the Topeka staff to eight positions and maintain 14 contract employees in Manhattan. The Manhattan office at KSU's Cooperative Extension Service is financed through contracts for the following programs: (1) residential technical assistance, $850,000 in FY 1983 and $186,000 requested in FY 1984; Kansas Energy Extension Service, $173,590 in FY 1983 and $125,000 requested in FY 1984; administrative services of the Director and Assistant Director, $43,403 in FY 1983; and energy hotline, $4,753 in FY 1983. Other contractual services are provided by the University of Kansas for school bus routing at $20,000 each year and by Wichita State University for thermal efficiency at $11,121 in FY 1983. A private firm received a $12,120 contract for appropriate technology development and a $30,000 government procurement contract has not been awarded in FY 1983.

The KEO current staffing pattern includes two administrators (Director and Assistant Director) who divide their duties between the two offices; one clerical position shared by two part-time people in Topeka and three part-time clerical positions in Manhattan; two federal program managers in Topeka; two state energy analysis and planning positions in Topeka; three residential energy specialists in Manhattan; one agricultural and two business energy specialists in Manhattan; two media support staff in Manhattan; and one part-time information specialist in Manhattan. Both offices employ other part-time personnel to perform a variety of short-term projects. A functional arrangement has evolved wherein the Topeka office performs basically administrative, managerial, and policy analysis functions and the Manhattan office provides the expertise and technical skills in a number of programs that previously were conducted inhouse by the KEO. The FY 1984 budget anticipates the Director being based in Topeka and delegating more responsibility to run the Manhattan office to someone else. Currently, the Director still operates out of the Manhattan office and runs the daily business of that operation, thus devoting only part-time to the broader duties as Director of the KEO, with the Assistant Director spending most of his time in Topeka performing managerial duties.

The proposed operating budget for the KEO follows:

Expenditure Summary	Agency Estimate FY 1983	Gov. Rec. FY 1983	Agency Request FY 1984	Gov. Rec. FY 1984
All Funds:				
State Operations	$1,361,201	$	$ 697,652	$
Aid to Local Units	77,000		62,275	
Total	$1,438,201	$	$ 759,927	$
State General Fund:				
State Operations	$ 87,034	$	$ 233,830	$
Percentage Change:				
All Funds	26.1%		(47.2)%	
State General Fund	(63.0)		168.7	
Full-Time Equivalent	6.0		8.0	

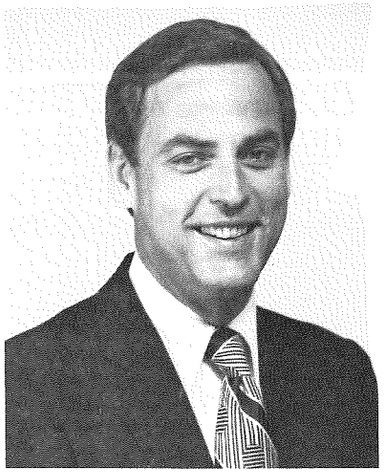
JE/sdp

Handout
1-11-83

ENERGY RELATED RESEARCH AND PUBLIC SERVICE

UNIVERSITY OF KANSAS
FISCAL YEAR 1982

energy research center



To The Citizens of Kansas. . .

I am pleased to present the Energy Research Center's annual report of energy research and related activities at The University of Kansas. The purpose of the report is to inform you of the University's many efforts—through education, research, and public service—to increase energy resources, use those resources wisely, and assure adequate supplies of energy for the generations of Kansans yet to come.

The efforts of our staff in gathering and compiling the information presented here will have been worthwhile if the report stimulates interaction between the KU faculty researchers and those of you who can benefit from their findings in your work or personal lives. In these challenging times I believe that only through such interaction can our energy problems be solved, and I hope you will not hesitate to contact the faculty members whose work is of special interest to you.

Robert F. Riordan

Robert F. Riordan, Director
KU Energy Research Center

ENERGY RELATED RESEARCH AND PUBLIC SERVICE

UNIVERSITY OF KANSAS
FISCAL YEAR 1982

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energy research center

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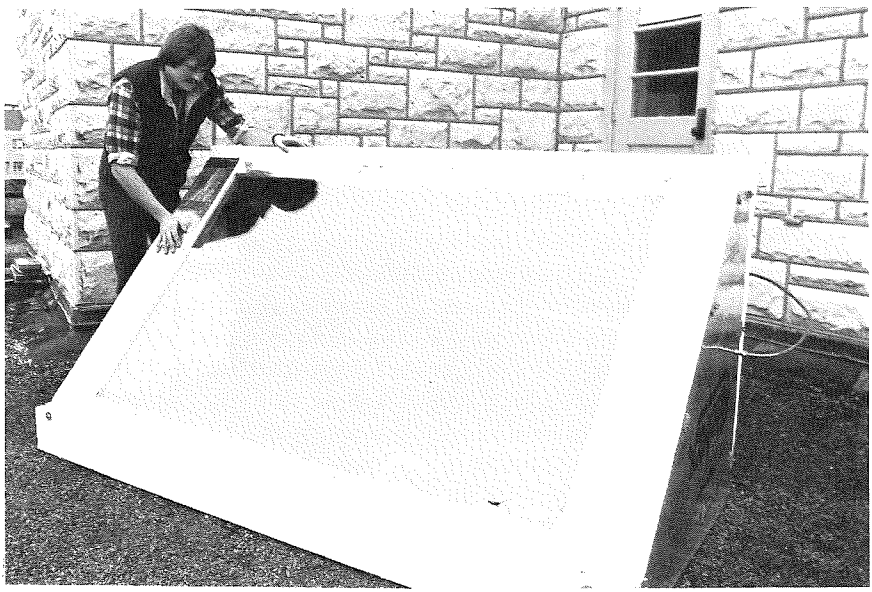
Note: The data in this booklet was submitted by University faculty and staff who are involved in energy research. Although we have collected information as thoroughly as possible, this is not necessarily an exhaustive report of energy research at The University of Kansas in fiscal year 1982.



Imaginative combination of existing technologies can result in increased energy efficiency. Thomas Scott Dean, along with graduate students John Heckethorn and Stanley Wiens, have improved the performance and capacity of an air-to-air heat pump by placing it in a well-insulated, passive solar enclosure. Here, Stanley Wiens displays the final project of this research.

OVERVIEW OF ENERGY PROJECTS AT THE UNIVERSITY OF KANSAS DURING FISCAL YEAR 1982

During Fiscal Year 1982 (July 1, 1981, through June 30, 1982) KU faculty and research personnel were engaged in 46 projects related to energy. The projects are divided into eight subject categories.

* Fossil fuels—13 projects.
* Conservation—11 projects.
* Education—6 projects.
* Policy, management, and law—5 projects.
* Solar energy—4 projects.
* Nuclear energy—3 projects.
* Economics—2 projects.
* Forecasting—2 projects.

The conservation category includes projects that have long range conservation potential as well as projects that have immediate application. The solar energy category includes only theoretical and developmental projects. Other solar projects may be found in the education and policy, management, and law categories.

Funds supporting energy projects during Fiscal Year 1982 totaled $1,982,543. (For projects whose funding extended beyond the Fiscal Year, the funds have been prorated on a fiscal year basis.) The amount of funding support for each of the eight subject categories of research is illustrated in Figure 1. Of significance, nearly one-half of the total funds received were for fossil fuel research, which recognizes the fact that Kansas ranks eighth among the states in oil production. The subject category with the second highest level of funding is conservation, which reflects its emerging importance as an effective energy strategy.

In the early 1970's, at the onset of the energy problem, there was some feeling that basic research findings in the nation's universities were not being channeled into practical applications. Certainly this criticism would not apply to the University of Kansas in Fiscal Year 1982, for two-thirds of the KU energy projects involved applications to industry, business, and government programs, or technology development. The portions of total energy research funds devoted to basic and applied research are shown in Figure 2.

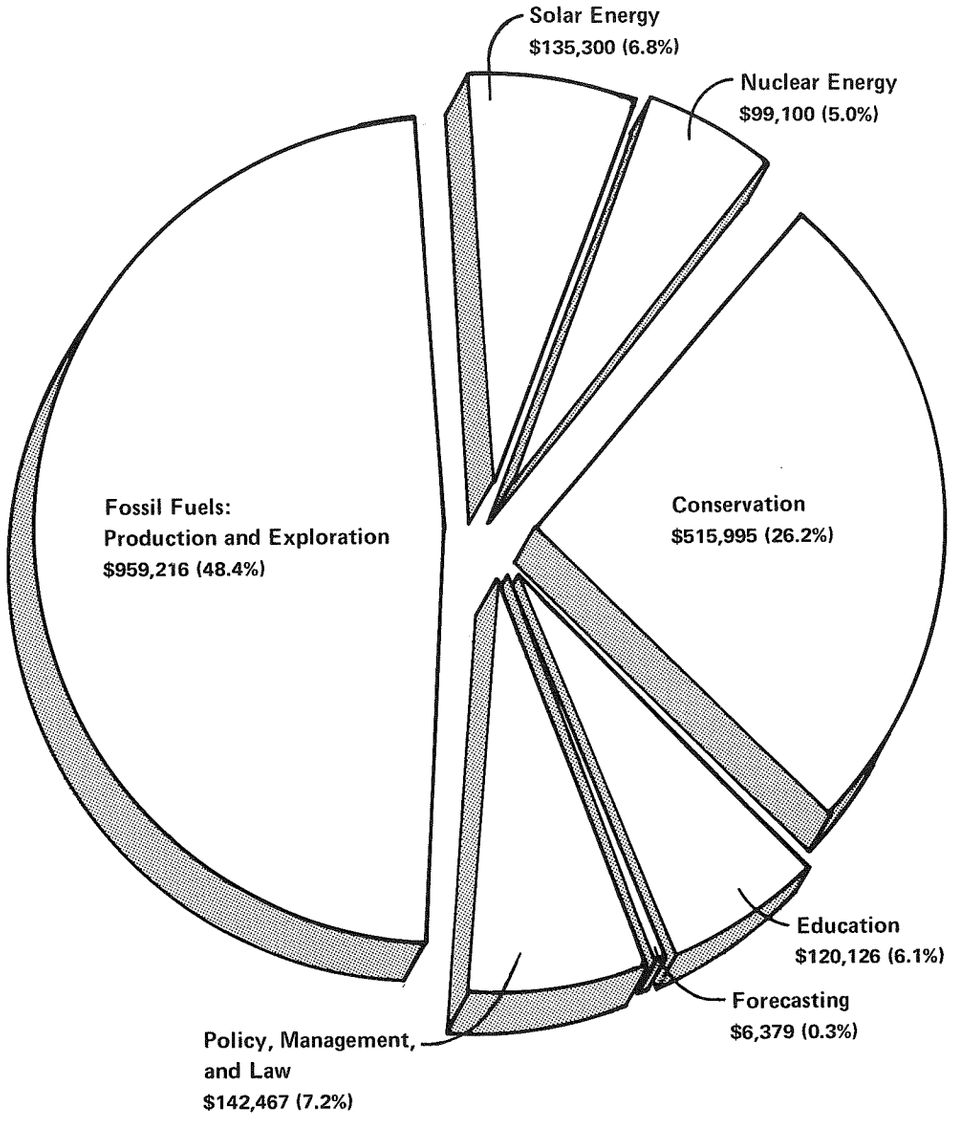


Figure 1
APPORTIONMENT OF RESEARCH FUNDS AMONG EIGHT SUBJECT CATEGORIES OF ENERGY PROJECTS AT KU IN FISCAL YEAR 1982

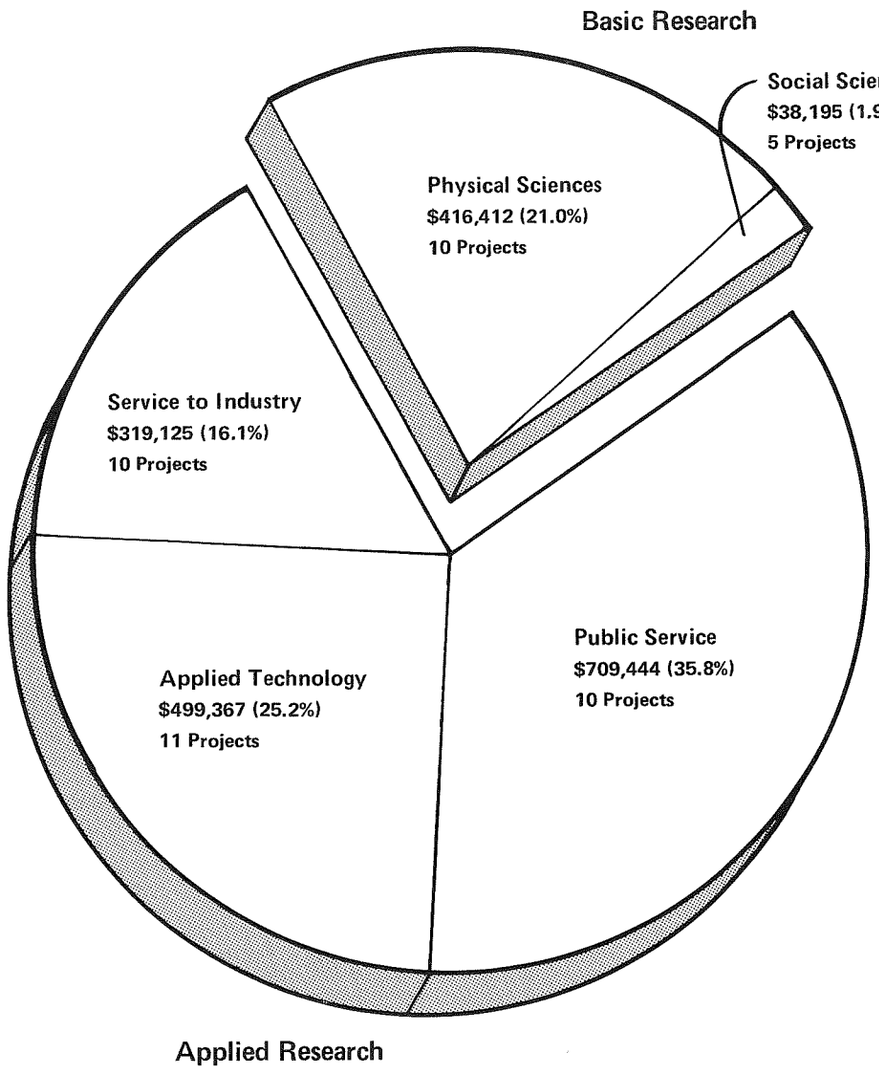


Figure 2
PORTIONS OF TOTAL RESEARCH FUNDS DEVOTED TO BASIC AND APPLIED ENERGY RESEARCH AT KU IN FISCAL YEAR 1982

Although some energy research projects can be conducted without funds, most projects require some funding for equipment, supplies, personnel, and other necessary expenses. There are four basic sources for funding: federal, state, and local governments and private organizations. The portions of the University's Fiscal Year 1982 energy research funds provided by these four sources are shown in Figure 3.

It is of special interest to note which research subjects were funded at KU in Fiscal Year 1982 by the various funding sources and at what level. The largest percentage of funds came from the State of Kansas, which provided nearly one-half of the University's energy research funds in Fiscal Year 1982. Of the monies provided by the State of Kansas, over 99 percent went to fossil fuels and conservation. Federal monies were more widely distributed among the eight subject categories, but most went to fossil fuels, conservation, solar energy, and nuclear energy. Private monies favored education, management, and conservation projects. Local governments, which provided only one-half of one percent of all monies, primarily funded policy and law projects. A detailed listing of all these funds appears in Figure 4.

William P. Smith, former Dean of KU's School of Engineering, is shown near part of the 15 acre experimental "energy forest" he helped establish in 1976. These maple, cottonwood, and black locust trees are expected to replenish their growth again and again after harvesting for fuel.

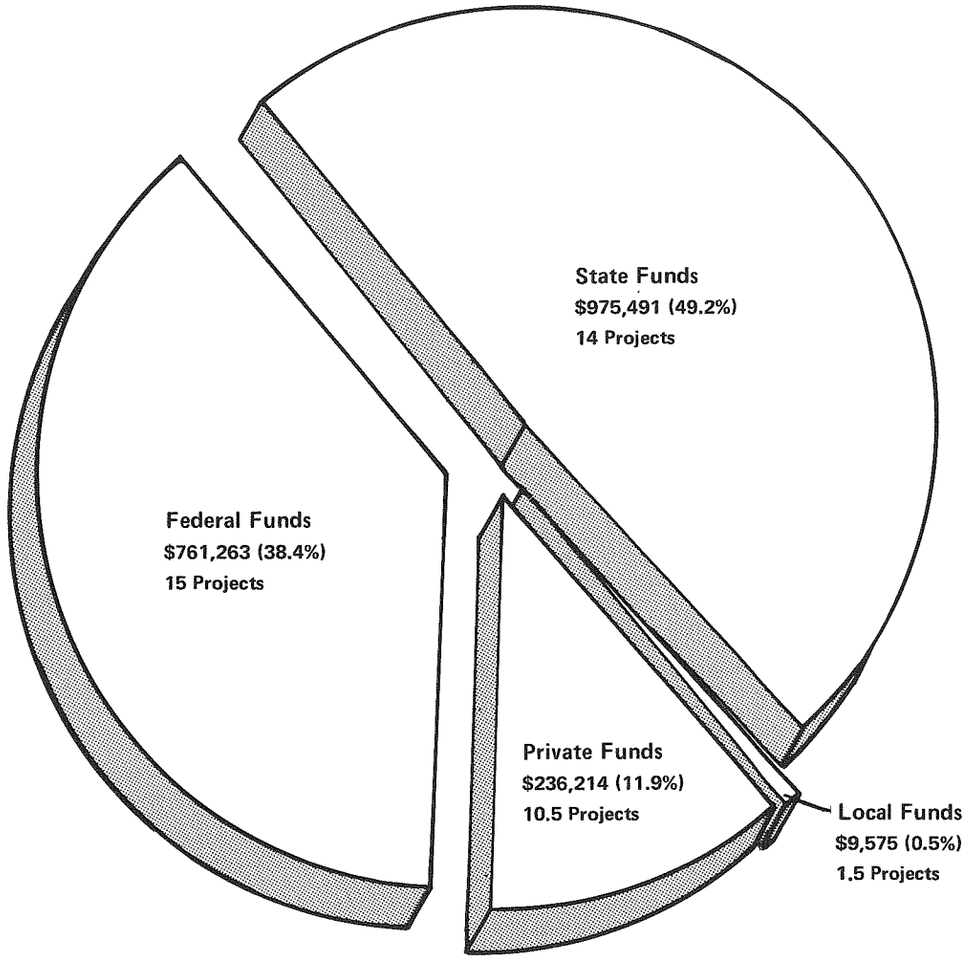


Figure 3
AMOUNTS OF ENERGY RESEARCH FUNDS PROVIDED TO THE UNIVERSITY OF KANSAS BY FEDERAL, STATE, LOCAL, AND PRIVATE SOURCES IN FISCAL YEAR 1982

Figure 4

FUNDS PROVIDED TO THE UNIVERSITY OF KANSAS FOR VARIOUS ENERGY RESEARCH SUBJECTS BY FEDERAL, STATE, LOCAL, AND PRIVATE SOURCES IN FISCAL YEAR 1982

16 Federally funded projects received $761,263 (38.4% of total funding) in FY 1982:

$144,825 (19.0%) for Conservation projects
$ 90,227 (11.9%) for Education projects
$ 1,076 (0.1%) for Forecasting projects
$261,035 (34.4%) for Fossil Fuel projects
$ 99,000 (13.0%) for Nuclear Energy projects
$ 30,000 (3.9%) for Policy, Management, and Law projects
$135,000 (17.7%) for Solar Energy projects

14 State funded projects received $975,491 (49.2% of total funding) in FY 1982:

$287,282 (29.5%) for Conservation projects
$ 4,228 (0.4%) for Forecasting projects
$683,681 (70.1%) for Fossil Fuel projects
$ 300 (0.0%) for Solar Energy projects

1.5 Locally funded projects received $ 9,575 (0.5% of total funding) in FY 1982:

$ 1,075 (11.2%) for Forecasting projects
$ 8,500 (88.8%) for Policy, Management, and Law projects

9.5 Privately funded projects received $236,214 (11.9% of total funding) in FY 1982:

$ 87,848 (37.2%) for Conservation projects
$ 29,899 (12.7%) for Education projects
$ 14,500 (6.1%) for Fossil Fuel projects
$103,967 (44.0%) for Policy, Management, and Law projects

5 projects receiving no funding are in the areas of:

Conservation
Economics
Policy, Management, and Law
Solar Energy

Conservation

Long Term Applications

Givens, Richard S. Chemistry	Photochemical Studies: Electron and Energy Transfer in Stacked Organic Molecules	Phillips Petroleum (Private) FY 1982: $10,000

The collection of radiant energy (range 400-250 nm) by specifically designed organic molecules that will have long-lived excited states will permit the subsequent conversion of that energy into useful heat of electron-transfer processes for chemical reactions. The organic molecules are to be synthesized and are stacked chromophores bound by a carbon backbone to increase the efficiency of energy and/or electron transfer. (4-1-82 to 3-31-83)

Harmony, Marlin D. Chemistry	Laser Spectroscopy	National Science Foundation (Federal) FY 1982: $75,000

Dr. Harmony is investigating the properties of molecular excited electronic states using laser spectroscopy. The methods have long-range potential for enhanced utilization and transformation of energy. In the short term, the aim is to increase fundamental knowledge of excited state dynamic and static properties. (6-15-81 to 1-15-83)

Harmony, Marlin D. Chemistry	Spectral Studies of Reactive Species	National Science Foundation (Federal) FY 1982: $50,000

Dr. Harmony is conducting studies of reactive intermediates originating in flames or electric discharges. This research has potential application in increasing combustion efficiency. (7-1-80 to 6-30-82)

Mertes, Kristin Chemistry	Mulicentered Activation of Molecular Oxygen	KU Biomedical Sciences Support (State) FY 1982: $4,818

Dr. Mertes is attempting to catalyse the activation of molecular oxygen for 1) incorporation into organic molecules, and 2) use in fuel cell technology using transition meal complexes. This research has application potential in developing biomimetic methods to accelerate oxidation for the purpose of making fuel cells more efficient. (8-15-81 to 6-30-82)

Conservation (continued)

Short Term Applications

Breipohl, Arthur Electrical Engineering	Experiment on Demand Subscription Service	Kansas Corporation Commission (State) FY 1982: $34,000

The purpose is to design and analyze the results of an experiment to be conducted by Kansas Power & Light, which tests the cost effectiveness of "demand subscription service," (DSS). DSS is designed to enable customers of an electric utility to choose the level of power which they will demand at the time of system peak. Those unwilling to limit their demands will be charged usual rates. Those who are willing to limit their demand will be charged lower rates. (7-1-81 to 6-30-82)

Crisp, John Mechanical Engineering	Energy Analysis and Diagnostic Center	University City Science Center (Private) FY 1982: $77,848

The research involves performing an energy audit and analysis for small and medium sized manufacturers within a 50 mile radius of Lawrence, with the intent of conserving energy by recommending energy conservation opportunities which are cost effective. (8-1-81 to 2-1-83)

Crisp, John Mechanical Engineering	Technical Assistance Energy Program	Kansas Board of Regents (State) FY 1982: $220,156

The objective of this program is to identify energy conservation measures for maximum feasible reduction of energy consumption in 25 buildings at the University of Kansas and 11 buildings at Wichita State University. Phases 1 and 2 of the program consisted of data collection on energy use and costs and on-site energy audits. Now in phase 3, the program is developing detailed energy consumption analyses of the 36 buildings, with expected cost savings and paybacks on appropriate energy conservation measures. In the final phase, energy conservation measures will be implemented. (9-18-81 to 12-31-82)

Domer, Shirley Energy Research Center	Study of Residential Energy Use in Four Kansas Counties	None

This is a study of users' satisfaction with their residential solar and wind power installations and with earth sheltered house construction. Convenience, comfort, and energy effectiveness of these alternative energy strategies are assessed. (3-1-82 and ongoing)

Lee, Joe Transportation Center, Civil Engineering	The Kansas Energy Extension Service Plan Program B: Transportation	Kansas State University (State) FY 1982: $22,788

The goal of this program is to disseminate information and provide technical assistance to major transportation user groups in order to assist them in reducing their transportation costs, thereby benefiting themselves, the state, and the nation. In order to maximize the energy savings gained through the program, specific projects are implemented each year. Each project targets a specific user group and includes delivery components by which assistance can be delivered. (1-15-81 to 6-30-82)

Muirhead, Vincent Aerospace Engineering	Investigation of the Internal and External Aerodynamics of Cattle Trucks	NASA Dryden Research Center (Federal) FY 1982: $19,825

The internal and external aerodynamics of cattle trucks are being studied in order to seek ways to 1) improve the environment of the animals, 2) decrease livestock losses associated with shipping, and 3) reduce vehicle drag to improve fuel comsumption. (7-1-81 to 9-30-82)

Theis, Christopher Architecture	Energy Conservation Analysis of Vernacular Buildings in Wabaunsee County Kansas	KU General Research Fund (State) FY 1982: $5,520

This project is an analysis of existing vernacular buildings in Wabaunsee County, Kansas, with the intent of determining 1) what, if any, considerations were given in their design to responding to the local climatic conditions in providing for human comfort and, 2) what measures might be taken to improve energy conservation by renovating a structure without affecting the original design. (7-1-81 to 6-30-82)

Economics

Houston, Douglas A. Business	Determinants of Consumer Investment Behavior in Energy Saving Durables	None

Consumer investments in energy conserving durables have been characterized by some as insufficient, in the sense that the discount rates consumers apply to future savings are too high. This research attempts to determine the factors underlying individual consumer discount rates. In a sense, it examines the rationality of the investor-consumer. (Ongoing)

Houston, Douglas A. Business	Pricing Structures in Utilities	None

The pricing structure in utilities is typically a "declining block" type. This pricing leads to some problems in translating the effect of general price changes into revenues. This work attempts to provide a useful model for utilities to use in developing a firmer basis for implementing price changes. (Ongoing)

Careful syncronization of traffic signals can save significant amounts of fuel by reducing the amount of time vehicles spend waiting at red lights. The KU Transportation Center has provided assistance to Kansas communities in solving this complex traffic engineering problem.

Education

Barr, B. G. Mechanical Engineering	Providing Technology Assistance to Small Businesses in SBA Region VII	Small Business Administration (Federal) FY 1982: $75,227

For more than 16 years this project has served as a technical information resource for small businesses in Kansas, Missouri, Nebraska, and Iowa. Project personnel have answered requests for information on more than 600 subjects, including wood waste use, tertiary recovery, solar technology, wind power, and other energy-related topics. (Ongoing)

Riordan, Robert Applied Energy Research & Public Service Program	1981 Solar Program Review and Workshop	Electric Power Research Institute (Private) FY 1982: $12,949

The objective of this project was to assist the Electric Power Research Institute in conducting its Annual Solar Review, in particular to develop the agenda and survey the potential attendees regarding their activities in solar energy. (4-1-81 to 11-30-81)

Riordan, Robert Applied Energy Research & Public Service Program	1982 Electric Power Research Institute Solar Power Systems Program Review	Electric Power Research Institute (Private) FY 1982: $10,000

The objective of this project is to present results and progress of EPRI sponsored research and to exchange information and ideas on the integration of solar energy and related technologies into utility systems and on how to best communicate the findings of EPRI's research to utilities. (3-1-82 to 11-30-82)

Riordan, Robert Applied Energy Research & Public Service Program	Conducting Research and Developing the Framework for the National Training Institute for Fossil Fuel-Fired Power Plant Operators	Kansas Power & Light Company (Private) FY 1982: $4,450

This funding provided for the preparation of a prospectus for establishment of an institute for fossil fuel-fired power plant operator training. (11-1-81 to 12-31-81)

Education (continued)

Riordan, Robert
Applied Energy Research
& Public Service Program

Services to be Provided to Applied Concept Corporation

Applied Concepts Corporation
(Private)
FY 1982: $2,500

This project provides general consulting services on the Jet Propulsion Laboratory's Thermal System Engineering Experiment with Applied Concepts Corporation. (4-1-81 to 3-31-83)

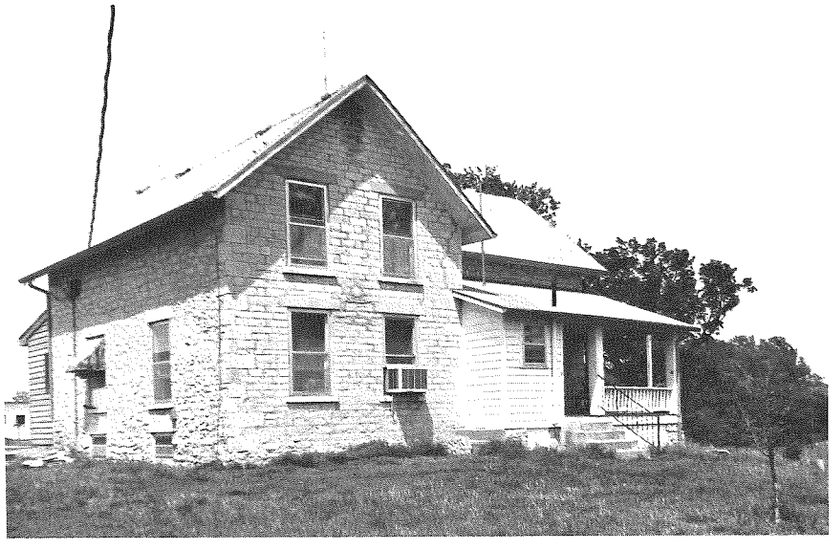
Smith, Walter S.
Education

COMETS: Career Oriented Modules

National Science Foundation
(Federal)
FY 1982: $15,000

COMETS provides teaching aids for grades 5 through 9 to encourage interest in science careers among early adolescents, both girls and boys. COMETS covers a broad spectrum of science areas, including careers in energy-related fields. (10-1-79 to 3-1-84)

Renovations of older buildings can increase energy efficiency in a form which is sympathetic to vernacular tradition as in Chris Theis's award-winning plans for renovation of the Waugh family's farmhouse in Waubunsee County. Pictured below is the stone building before renovation. On the facing page is the architect's drawing of the south elevation, showing the passive solar features presently under construction.



Forecasting

Houston, Douglas A.
Business

Electricity Demand Analysis

KU General Research Fund
(State)
FY 1982: $4,228

This electricity demand analysis study examines factors which influence the residential consumption of electricity through time. Major concerns of this study are: 1) the speed of consumption adjustment, 2) a model with good predictive attributes, 3) the problems of aggregation of data to modeling. (5-17-82 to 6-30-82)

Strauss, Eric
Urban Planning,
Applied Energy Research
& Public Service

Energy Consumption Report for Each Community in Johnson and Wyandotte Counties

Mid America Regional Council
(Federal/Local)
FY 1982: $2,151

The Energy Consumption Report details the amount of energy consumed in 1978, 1979, and 1980 in each of the incorporated communities within Johnson County and Wyandotte County, by sector and by type of energy (electricity, natural gas, and petroleum). Sectors used were residential, commercial, industrial, public, and transportation. The report also includes a detailed account of the electricity and natural gas sales by individual utility companies to the communities in Wyandotte County. (8-27-81 to 12-18-81)

SOUTH ELEVATION

0 5 10 20

Fossil Fuels

Angino, Ernest E.
Geology

Potential Oil Recovery and Statigraphic Relations of Kansas Oil Shales

Kansas Geological Survey
Mobil Oil Foundation
(State/Private)
FY 1982: $9,000

The purpose of this project is to assess the potential of Kansas oil shales, identify potential oil shales in Kansas rock columns, and to determine what oil is recoverable in light of new techniques. (1-1-81 to 6-30-82)

Brady, Lawrence
Kansas Geological Survey

Kansas Coal Resources

U.S. Department of Interior
(Federal)
FY 1982: $36,000
State of Kansas
FY 1982: $28,000

This program focuses on Kansas coal resources, found in thin beds throughout eastern Kansas. Using available data and geophysical logs, this program is analyzing the extent of Kansas coal resources, particularly in several eastern Kansas formations. (Ongoing)

Clark, Hector
Mechanical Engineering

Development of Coke Slurries as Heavy Boiler Fuel

American Oil Company (AMOCO)
(Private)
FY 1982: $10,000

Interest in the use of slurry fuels in industrial and utility boilers has increased in recent years as efforts have grown to replace some of the liquid hydrocarbon content of boiler fuels with cheaper alternatives. However, fuels formed from oil with admixtures of powdered coal or coke carry the risk of significantly increased wear in pumps valves, pipes and burner nozzles as a result of erosion by the solid particles. The present study aims to assess quantitatively the erosivity of a number of compositions of such fuels. (3-1-82 to 2-28-83)

Dellwig, Louis
Geology

Inventory and Evaluation of Potential Oil Shale Development in Kansas

Kansas Energy Office
(State)
FY 1982: $441

The University of Kansas Center for Research, Inc. is providing an inventory of and evaluation of the potential of oil shale in Kansas for development. The primary data sources shall be information derived from data collection residing with the Kansas Geological Survey, the U.S. Geological Survey, and with other sources. Oil shale, for the purpose of this investigation, is defined as shales containing kerogen, a non-crude petroleum fluid product. (10-1-80 to 9-15-81)

Fossil Fuels (continued)

Doveton, John
Kansas Geological Survey

Petrophysics

State of Kansas
(State)
FY 1982: $83,000

Much of the information about the Kansas subsurface is found in drillers' logs—records of rock formations encountered during oil and gas drilling—that are stored at the Survey. This program applies computer technology to log analysis, and is using automated well log analysis to search for secondary prospects in several Kansas formations. (Ongoing through July 1985)

Green, Don
Chemical & Petroleum Engineering

Development of a Method for Evaluating Carbon Dioxide Miscible Flooding Prospects

Department of Energy
(Federal)
FY 1982: $80,378

Carbon dioxide can be injected into petroleum reservoirs to remove oil that would not be recovered by using conventional technology. Methods of evaluating the carbon dioxide process and predicting the performance of the process in any particular reservoir are being sought in this research. (10-1-79 to 8-15-83)

Green, Don W.
Willhite, G. Paul
Chemical & Petroleum Engineering

Tertiary Oil Recovery Project (TORP)

State of Kansas
(State)
FY 1982: $271,740

Research is being conducted on ways of recovering additional oil from reservoirs after production has become uneconomical by conventional means of production. The newer techniques involve the injection of chemicals, or the use of thermal energy to displace residual oil from a reservoir. (7-1-74 and ongoing)

Rothe, George H.
Geology

Possibility of Induced Seismicity in the Sleepy Hollow Oil Field—Red Willow County, Nebraska

U.S. Geological Survey
(Federal)
FY 1982: $22,663

The goal of this study is to determine the cause and tectonic significance of recently discovered seismicity in and near the Sleepy Hollow Oil Field. A dense, eight-station telemetered (to Lawrence) seismograph array is used to examine the relationship of the instrumentally recorded seismicity to the injection of fluids for secondary recovery of petroleum in the oil field. The anticipated short epicentral distances should enable us to determine, for the first time, well constrained earthquake focal depths and focal mechanisms and the nature of the stress field in the Mid-continent. (12-13-81 to 12-12-83)

Fossil Fuels (continued)

Skelton, Larry Kansas Geological Survey	Wichita Well Sample Library	State of Kansas (State) FY 1982: $92,000

The Survey's Wichita Well Sample Library collects, stores, and loans rock samples from holes drilled for oil and gas in Kansas. Explorationists use these samples as an aid in drilling. Thus, the Library provides drillers with a permanent record of drilling in the state. More than 3,500 samples were loaned last year, and use of the Library has increased dramatically. The Survey is currently automating library data and sales management, and is adding to the Library itself. (Ongoing)

Swift, George W. Chemical & Petroleum Engineering	Research on Extractive Distillation Processes to Recover Petrochemical Feedstocks	National Science Foundation (Federal) FY 1982: $17,540

This project is one of cooperative research with Engineer Efren Aladana Gaytan of the Mexican Institute of Petroleum in Mexico City, for the purpose of studying extractive distillation processes to recover petrochemical feedstocks such as 1, 3 butadiene and isoprene. Included will be research on possible solvents for use in the extraction process. (6-15-80 to 11-30-82)

Watney, W. Lynn Kansas Geological Survey	Structural and Statigraphic Analysis	State of Kansas (State) FY 1982: $60,000

The search for oil and gas in Kansas has now turned to subtle, subsurface stratigraphic traps. This program investigates the mechanisms involved in oil and gas reservoirs; the deposition of oil and gas; and is evaluating subsurface stratigraphy in the lower Permian, the Pennsylvanian, and the Mississippian. Results will aid and encourage oil and gas exploration. (Ongoing through 12-84)

Willhite, G. Paul Chemical & Petroleum Engineering	Evaluation of Methods of Reducing Permeability in Porous Rocks by In-situ Polymer Treatments	Department of Energy (Federal) FY 1982: $104,454

The investigators are evaluating the use of polymers to reduce permeability in porous rock in tertiary oil recovery processes. (10-1-80 to 9-30-82)

Fossil Fuels (continued)

Zarley, Carol Kansas Geological Survey	Oil and Gas Records and Information Services	State of Kansas (State) FY 1982: $144,000

This program provides information about Kansas oil and gas exploration rates, production, and their economic impact. This program also collects, stores, and makes available well logs and other information related to oil and gas. Staff members are producing an updated pipeline map and a study of oil and gas production on state and federal lands in Kansas. (Ongoing)

Members of KU's Tertiary Oil Recovery Project team and employees of the Mack Colt Oil Company mix a chemical tracer for injection into a well in Southeastern Kansas. The use of a tracer helps describe the nature of the oil producing reservoir.

Nuclear Energy

Gilles, Paul W.
Chemistry

High Temperature Chemistry

North Atlantic Treaty Organization (NATO)
(Federal)
FY 1982: $5,600

Dr. Gilles is studying high temperature vaporization properties and thermodynamics of metal-rich titanium-oxygen alloys. (7-1-81 to 6-30-82)

Milavikas, Louis R.
Radiation Biophysics

Fusion Type Neutron Kerma in Tissue Equivalent Plastic, Carbon, Magnesium, and Iron

National Science Foundation
(Federal)
FY 1982: $14,000

In this research project, Dr. Milavickas is measuring the kerma factor for fusion-type neutrons for various types of materials. The kerma factor is directly related to the neutron induced heating of the materials. In fusion systems, neutrons will irradiate structural materials, and it is important to know the amount of heat that will be deposited. (2-1-82 to 7-1-84)

Zeller, Edward J.
Geology

Resource and Radioactivity Suvey in Antarctica by Airborne Gamma-ray Spectrometry

National Science Foundation
(Federal)
FY 1982: $79,500

This project is concerned with a mineral resource assessment of the exposed rock outcrops in Antarctica. The program is primarily concerned with the assessment of radioactive mineral resources (uranium and thorium) but also involves the evaluation of any other mineral resources that may be encountered in survey activities. The nature of antarctic geography makes this a long term survey. (6-1-76 to 7-1-83)

Policy, Management and Law

Private Sector

Riordan, Robert
Applied Energy Research & Public Service Program

The Establishment of a Group of Midwest Utilities to Address Solar Energy Issues

Kansas Power & Light, Kansas City Power & Light, Kansas Gas & Electric, Gulf States Utilities, Northern States Power
(Private)
FY 1982: $100,000

This is a three year project to work with a group of utilities to plan and implement a program to incorporate solar energy into their operations, when appropriate. The Applied Energy Research & Public Service Program is the overall coordinator of the effort. (3-15-81 to 3-14-84)

Strauss, Eric
Urban Planning,
Applied Energy Research & Public Service Program

Profile of the Modern Public Utility Innovator

American Public Power Association
(Private)
FY 1982: $3,967

This study is testing the hypothesis that innovative managers of public power systems share common approaches to management style, philosophy, and interaction with other individuals who influence energy production and consumption. (4-1-82 to 6-30-83)

Public Sector

Clark, John G.
History

Federal Fuel Policies, 1900-1948: A History

National Humanities Center
(Federal)
FY 1982: $30,000

Dr. Clark is writing a history of U.S. policies toward fuel resources, principally oil, natural gas, and coal from 1900 through 1948. The study will focus upon the fuel industries, the clash of competing interest groups, the administration of established policies, electric power as a consumer of fuels (including analysis of holding company structure), efforts to define the public interest in the use of non-renewable fuel resources, and the impact of federal policy upon various producing and consuming regions in the U.S. (1976 to 1983)

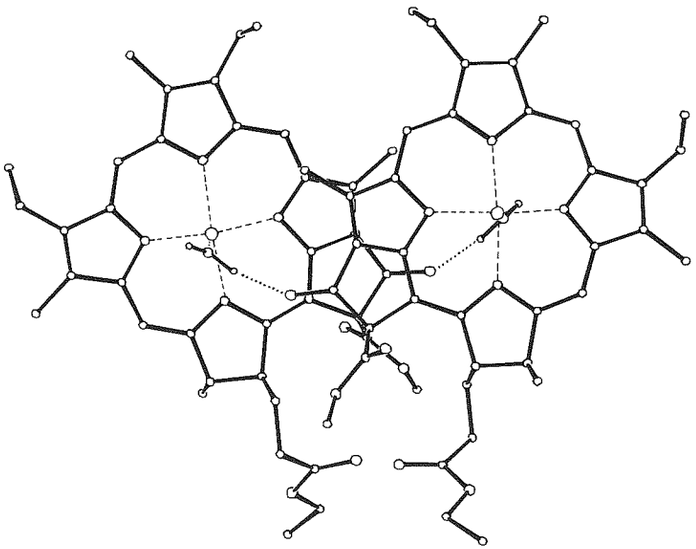
Policy, Management and Law (continued)

Gergacz, John W. Business	Legal Aspects of Solar Energy	None

Dr. Gergacz is analyzing the legal methods of protecting a solar user's access to sunlight. Further, an analysis of the nature of property and airspace rights is being undertaken to explain the conflicts inherent in protecting solar access. (1978 and ongoing)

Strauss, Eric Urban Planning, Applied Energy Research & Public Service Program	Local Governmental Ordinances and Incentives to Implement Residential Energy Conservation in New and Existing Buildings	City of Lawrence (Local) FY 1982: $8,500

Dr. Strauss is assisting the City of Lawrence in evaluating, adopting and amending municipal planning, financial and legal ordinances to assist residential energy conservation in new and existing structures through the use of the current zoning ordinance, subdivision regulation and building code. (3-15-81 to 12-31-81)



Chemistry professor Gerald Maggiora's drawing illustrates the structure of a chlorophyll special-pair dimer, which is thought to play an important role in photosynthetic energy conversion in plants. Once the plants' conversion process is clearly understood, it may be possible to design solar cells that could convert sunlight to electricity in a similar efficient manner.

Solar Energy

Dean, Thomas S. Architectural Engineering	Passive Assist For Air-To-Air Heat Pumps	Graduate School Research Fund (State) FY 1982: $300

This study tests the effectiveness of solar assistance in increasing the efficiency of an air-to-air heat pump. An externally insulated enclosure with south facing glazing surrounds the outside unit of a heat pump. Surrounding air temperature is elevated, resulting in enhanced coefficient of performance and capacity. Compressor heat is conserved. (8-15-81 to 8-14-83)

Enoch, Jacob Physics & Astronomy	Plasma-Insulator Interactions In Space	NASA Lewis Research Center (Federal) FY 1982: $60,000

The investigators are calculating the parasitic losses expected for large solar power cell arrays in space, due to interaction with the ambient plasma. (8-15-79 and ongoing)

Maggiroa, Gerald M. Chemistry and Biochemistry	Molecular Design Principles for Biomimetic Solar Energy Conversion Systems	Department of Energy (Federal) FY 1982: $75,000

A variety of theoretical chemical procedures are being used in a comprehensive investigation of the structure and properties of biological and biomimetic solar energy conversion systems. The major goal of this work is the development of molecular design principles which will enable chemists to more efficiently formulate structures of potential biomimetic photoconversion systems possessing specified properties. (1-1-76 and ongoing)

Smith, William Electrical Engineering	Burning Wood as a Supplement to Solid Waste	None

The projected price increase of gas and oil have led to a study of burning solid waste and wood to provide some for the University of Kansas' energy needs. This study discusses the technical and economic considerations of burning wood. Topics included are sources and availability, collection and transportation, preparation and burning. (1976 and ongoing)

ENERGY RELATED
GRADUATE THESES AND DISSERTATIONS

Architecture

Master of Science in Architectural Engineering

Cohen, Jeffrey B.	Energy Conservation in Construction Industry
Heckethorn, John D.	Passive Solar Heat Pump Assist
McKenzie, Kevin K.	Energy Conservation Techniques, Strategies, and Equipment for Large Buildings
Sisk, Darrel B., Jr.	Comparison of Predicted and Measured Solar Radiation
Stillwell, John L.	The Utilization of Solar Energy as Electricity
White, Christopher, B.	Alternative Energy Application for Developing Countries
Wiens, Stanley K.	Passive Solar Heat Pump Assist

Engineering

Doctor of Philosophy in Engineering

Ezekwe, John Nnaemeka	Effect of Paraffinic, Naphthenic and Aromatic Distribution in the Hydrocarbon Mixture and Water on the Phase Equilibria of Carbon Dioxide-Hydrocarbon Systems over the Temperature Range from 333 K to 366 K
Lin, Zsay-Shing	Development of Reservoir Simulations Which Handle Wellbore Storage, Infinite Conductivity Vertical Fractures, Skin Effect, Non-Darcy Flow and Klinkenberg Effect for Various Boundary Conditions and Production Control Policies

Doctor of Engineering

Sutikno	Costs of Refining Surface-Retorted Paraho Shale Oil to Transportation Fuels Via Three Refining Schemes and Simulations of Hydrotreating, Hydrocracking, and Fluid Catalytic Cracking Processes in Shale Oil Refining

Master of Engineering

Hunt, James A.	Polyacrylamide Polymer Flow through Carbonate Rocks for Enhanced Oil Recovery: An Experimental Study of Polymer-Brine Stability, Resistance Factor, and Related Geologic Characteristics

Master of Science in Engineering

Azadeh, Hehrdad	Development of a Method for Evaluating Carbon Dioxide Miscible Flooding Prospects (Sand Packed Slim Tube)
Castañeda-Martinez, Juan Carlos	A New Equation Relating Minimum to Operating Refluxes and Stages for Binary Systems and Implementation of the Hanson and Newman Method in a Process Design Simulator
El Shoubary, Youssef M.T.	Study of the Clay Effect on Crude Oil Combustion Using Thermogravimetric Analyzer (TGA) and Differential Scanning Calorimeter (DSC)
Fakeeha, Anis H.	Boiling Heat Transfer of a Vertical Surface
McCool, C. Stanley	A Study of Pressure Behavior for the Determination of Mobility Control During Laboratory Sufactant Flooding

Liberal Arts and Sciences

Master of Science in Geology

Schlinsog, Dale G.	Potential Oil Recovery and Stratigraphic Relations of Kansas Oil Shales

DEPARTMENTS INVOLVED IN ENERGY RELATED RESEARCH AT THE UNIVERSITY OF KANSAS

School of Architecture

Architecture	Passive solar energy.
Architectural Engineering	Conservation, passive solar energy.
Urban Planning	Forecasting, policy, management and law.

School of Business

Business	Economics, forecasting, legal implications of solar energy.

School of Education

Education	Educational programs dealing with many forms of energy.

School of Engineering

Aerospace Engineering	Conservation
Chemical and Petroleum Engineering	Fossil fuel exploration and production.
Civil Engineering	Conservation.
Electrical Engineering	Biomass, conservation.
Mechanical Engineering	Conservation, education, fossil fuel production.

College of Liberal Arts and Sciences

Chemistry	Conservation theory, basic solar theory.
Geology	Fossil fuel exploration and production, nuclear energy.
History	Governmental policy and law.
Physics	Solar energy.

Non-Academic Departments

Applied Energy Research and Public Service Program	Conservation, education, forecasting, governmental policy and law, management.
Transportation Center	Kansas Energy Extension Service (Program B: Transportation).

The Kansas Geological Survey, located on the University of Kansas West Campus, carries on numerous fossil fuel projects to aid and encourage appropriate development of Kansas oil, gas, and coal resources.

DEPARTMENTS OFFERING ENERGY RELATED COURSES AT THE UNIVERSITY OF KANSAS

School of Architecture

Architecture	Passive solar energy, insulation and weatherization.
Architectural Engineering	Active and passive solar energy.
Urban Planning	Transportation.

School of Engineering

Chemical and Petroleum Engineering	Fossil fuels, nuclear energy.
Civil Engineering	Hydropower, transportation.
Electrical Engineering	Conversion of mixed energy forms into electrical power.
Mechanical Engineering	Active solar energy.

School of Law

Energy policy and law.

College of Liberal Arts and Sciences

Biophysics	Nuclear energy.
Chemistry	Energy chemistry.
Geography	Active and passive solar energy, biomass, transportation, national and world energy problems.
Geology	Fossil fuels, nuclear energy, mixed energy resources.
Meteorology	Agricultural energy.
Physics	Active and passive solar energy.

SHORT COURSES OFFERED THROUGH THE UNIVERSITY OF KANSAS DIVISION OF CONTINUING EDUCATION

5005 W. 95th Street
Shawnee Mission, Kansas 66207
(913) 648-5042

Forecasting Demands for Electrical Power

Co-sponsored by The University of Kansas School of Engineering
Instructor: Aruthur Breipohl, Professor of Electrical Engineering

This short course and workshop provides utility or commission personnel with practical forecasting methods and experience. Using his/her own data, the participant produces at least one computer-generated forecast. Three forecasting methods are presented: econometric, end-use, and time series. Strengths and limitations of each method are explained.

Heart of America Drilling and Production Institute

Co-sponsored by the Petroleum Industry Educational Steering Committee

This institute presents technical advancements in the drilling and production field, and recent research findings. Lectures, discussions, demonstrations, and industry exhibits inform participants in the operation and maintenance of drilling and production equipment. Recent improvements in drilling and production techniques are presented and explained. The institute is especially designed to benefit field operators, technicians, maintenance crews, production supervisors, superintendents, and application engineers. The proceedings of this conference are indexed by major international engineering publications.

Heart of America Gas Compressor Institute

Co-sponsored by the Petroleum Industry Educational Steering Committee

Lectures, discussions, demonstrations, hands-on sessions, and industry exhibits inform institute participants of technical advancements and recent developments in the gas compression industry and the operation and maintenance of gas compression equipment. The institute is designed especially to benefit field operators, technicians, maintenance crews, production supervisors, superintendents, and application engineers. The proceedings of the conference are indexed by major international engineering publications.

Heart of America Gas Measurement Institute

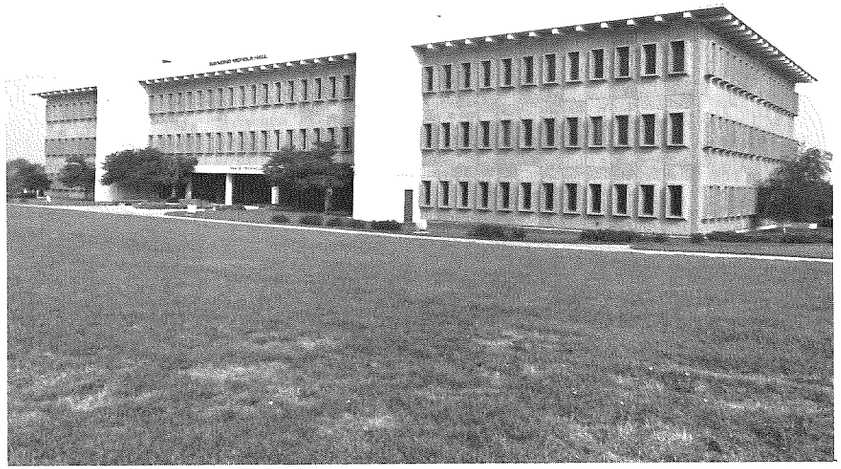
Co-sponsored by the Petroleum Industry Educational Steering Committee

The two-day institute presents technical advancements and recent findings in gas measurement. Lectures, discussions, demonstrations, and industry exhibits inform participants in the operation and maintenance of gas measurement equipment. Recent improvements in equipment and techniques are presented and explained. The program is especially designed to benefit field operators, technicians, maintenance crews, production supervisors, superintendents, and application engineers. The proceedings of the conference are indexed by major international engineering publications.

Heart of America Pipeline Operation and Maintenance Institute

Co-sponsored by the Southwest Kansas Petroleum Industry Educational Steering Committee

The institute presents two days of lectures, discussions, demonstrations, and exhibits on understanding, operating, and maintaining liquid gas and products pipelines and on improvements and techniques recently developed. The program is especially designed to benefit field operators, technicians, maintenance crews, foremen, supervisors, superintendents, and application engineers. The proceedings are indexed by international engineering publications.



Several University of Kansas energy projects, including the Energy Research Center, are located in Nichols Hall. Also known as the Space Technology Center, the building is dedicated to multidisciplinary research in the sciences, humanities, engineering, and business and to transfer of the research results to the public.

THE UNIVERSITY OF KANSAS
ENERGY RESEARCH CENTER

The Energy Research Center serves as a focal point for information about energy research at The University of Kansas. The Center conducts seminars, collects and disseminates information, maintains a library of energy information, and works with KU faculty in developing research proposals.

If the reader would like more detailed information about any of the projects described in this booklet, please contact the project's principal investigator. For general information about the University's energy effort, please contact:

The Energy Research Center
345 Nichols Hall
2291 Irving Hill Drive
Lawrence, Kansas 66045
(913) 864-4079

Prepared by:
The Energy Research Center
345 Nichols Hall
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Handout
1-11-83

REPORT

OF THE STATE CORPORATION COMMISSION

TO THE KANSAS LEGISLATURE

UNDER

THE KANSAS NATURAL GAS PRICE PROTECTION ACT

1983 SESSION

State of Kansas

JOHN CARLIN — Governor
RICHARD C. (PETE) LOUX — Chairman
JANE T. ROY — Commissioner
PHILLIP R. DICK — Commissioner
CAROL J. LARSON — Executive Secretary
BRIAN J. MOLINE — General Counsel

State Corporation Commission

Fourth Floor, State Office Bldg.
Ph. 913/296-3355
TOPEKA, KANSAS 66612-1571

JANUARY 8, 1983

TO ALL MEMBERS OF THE KANSAS LEGISLATURE:

THIS REPORT IS SUBMITTED PURSUANT TO THE PROVISIONS OF K.S.A. 1980 SUPP. 55-1401 ET SEQ. WE HOPE THAT IT IS USEFUL TO YOU.

SINCERELY,

R. C. "PETE" LOUX, KCC CHAIRMAN

REPORT OF THE STATE CORPORATION COMMISSION
TO THE KANSAS LEGISLATURE
FOR 1983

K.S.A. 1980 Supp. 55-1411 requires the State Corporation Commission to monitor and report annually to the Legislature on the effect of the Kansas Natural Gas Price Protection Act of 1979 (K.S.A. 1979 Supp. 55-1401 et seq) on the availability of natural gas in the state. This report covers the period from July 1, 1981 through June 30, 1982.

Total production for the entire year of 1981 was 654,337,761 Mcf (thousand cubic feet). From January through October of 1982, total production was 363,494,064 Mcf. Intent-to-drill permits were down from 20,551 in 1981 to 14,524 in 1982. Both the drop in production and the drop in Intent-to-Drill filings are attributable to conservation, the present glut of natural gas reserves, and---most importantly--- the industry's increasing flow of out-of-state gas which was purchased under the mandatory "take or pay" contracts.

In monitoring the effect of the Kansas Natural Gas Price Protection Act on the availability of natural gas in Kansas, staff contacted natural gas operators. The information obtained is outlined in the attached schedules which show the nature of gas sales from wells in the state over the past year.

Based on the information from the operators of natural gas wells and public records, it is the Commission's belief that the Kansas Natural Gas Price Protection has not adversely affected the availability of natural gas within the state.

January 5, 1983

GAS FROM WELLS THAT ARE UNDEDICATED:	TOTAL NUMBER OF WELLS	INTEND TO SELL GAS INTERSTATE	INTEND TO SELL GAS INTRASTATE	UNDECIDED
JULY 1, 1978 THROUGH JUNE 30, 1979	3	0	0	3
JULY 1, 1979 THROUGH JUNE 30, 1980	0	0	0	0
JULY 1, 1980 THROUGH JUNE 30, 1981	14	5	5	4
JULY 1, 1981 THROUGH JUNE 30, 1982	30	3	8	19

January 5,1983

GAS FROM WELLS DEDICATED TO:	NUMBER OF GAS WELLS WITH CONTRACT DATES FROM JULY 1,1978 THROUGH JUNE 30,1979	PERCENTAGE	NUMBER OF GAS WELLS WITH CONTRACT DATES FROM JULY 1,1979 THROUGH JUNE 30,1980	PERCENTAGE	NUMBER OF GAS WELLS WITH CONTRACT DATES FROM JULY 1,1980 THROUGH JUNE 30,1981	PERCENTAGE	NUMBER OF GAS WELLS WITH CONTRACT DATES FROM JULY 1,1981 THROUGH JUNE 30,1982	PERCENTAGE
INTERSTATE	303	55%	402	63%	394	58%	233	53%
INTRASTATE	245	44.5%	236	37%	268	40%	180	41%
UNDEDICATED	3	0.5%	0	0%	14	2%	30	6%
TOTAL	551	100%	638	100%	676	100%	443	100%

NOTE: TOTALS ONLY REFLECT GAS WELLS FOR WHICH AN NGPA APPLICATION HAS BEEN FILED.