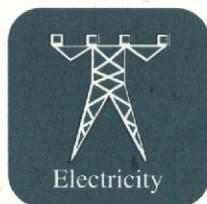
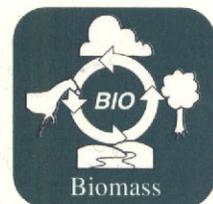


Nebraska Energy Office Annual Report 1995



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STATE OF NEBRASKA



E. Benjamin Nelson
Governor

EXECUTIVE SUITE
P.O. Box 94848
Lincoln, Nebraska 68509-4848
Phone 402-471-2244
Fax 402-471-6031

February 15, 1996

Dear Nebraskans:

Last year, in the Energy Office's *Annual Report*, the agency predicted that ethanol production in the state would soar. In fact, 1995 was a banner year for ethanol production. Nebraska vaulted from being a marginal ethanol producer in 1985 to the nation's number three producer.

In 1995, it was estimated that 16 percent of the state's corn crop was used to produce ethanol, sweeteners and related products. For years, Nebraskans have been told that one certain path to economic vitality was to develop value-added industries that complemented the state's bountiful agricultural harvests. Ethanol and related corn by-products are proving that advice correct. The state's seven plants employ 735 Nebraskans directly and an estimated 3,600 indirectly. A total of 4,325 people owe their jobs to the state's newest growth industry. Corn growers farming 400 acres can expect to earn an additional \$2,500-\$5,000 if their crop is used for ethanol production.

A continuing success story is the Dollar and Energy Saving Loan Program. As of June 30, 1995, more than \$51 million have been loaned to the state's residents for energy efficiency improvements. This loan fund was capitalized with \$17.68 million in oil overcharge dollars. The loan fund and \$9.37 million in loan repayments have leveraged in excess of \$24.17 million from the state's private lenders. Because these funds were returned to the state to provide restitution to Nebraskans overcharged for oil company products, it is only fitting that more than three-quarters of the loans made to date have been for energy efficiency improvements in the homes of Nebraskans. The balance of the loans have been made on farms, in businesses and to local governments. The program continues to create economic activity and, to date, is responsible for creating the equivalent of 935 jobs in communities across the state.

Details of these successes and other agency activities can be found in the Nebraska Energy Office's 1994-1995 *Annual Report*. It is with great pleasure that I present this *Report* to you now.

Sincerely,

A handwritten signature in black ink, appearing to read "E. Benjamin Nelson".

E. Benjamin Nelson
Governor

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This *Annual Report* is for the period July 1, 1994, through June 30, 1995, except where noted.

Energy Projects Division

The Energy Projects Division is responsible for administering the federally-funded State Energy Conservation Program created under the *Energy Policy Conservation Act* of 1975. The program allows the state to use its discretion in providing energy conservation services, but the Energy Office must submit an annual plan to the U.S. Department of Energy for review and approval.

In general, agency staff operates the program directly. Occasionally, the agency may work closely with outside contractors hired to perform specific projects. The Division is also responsible for preparing annual energy saving reports, *Nebraska Energy Statistics*, the agency's *Annual Report*, the *Nebraska Energy Quarterly* and federal or court reports on oil overcharge programs.

During calendar year 1994, the federally-funded program produced annual energy savings of 6.401 trillion British thermal units, which is equivalent to more than 51 million gallons of gasoline. Figure 1 shows estimated energy savings over the past ten years as a result of specific projects.

- Energy shortage management and emergency preparedness
- Energy policy implementation
- Education and Information

Federally-Mandated Projects

According to the *Energy Policy Conservation Act*, the Energy Office must undertake mandatory projects in the specific areas of procurement, transportation, lighting standards, thermal standards and right-turn-on-red. The agency submits plans to the federal government for its review and approval of projected activities in these areas:

- The Energy Office coordinates and publishes a rideshare roster for state employees seeking to carpool. Nearly 100 state workers are listed on the roster from communities surrounding Lincoln.
- Nebraska satisfied the right-turn-on-red mandatory in 1973 when the Legislature passed both right-turn-on-red and left-turn-on-red legislation.
- Nebraska satisfied the minimum mandatory requirements in 1980 when the Legislature passed thermal efficiency standards, lighting efficiency standards and procurement procedures for state government.

Oil Overcharge Project Management

Exxon oil overcharge projects are managed as State Energy Conservation Program projects (see pages 2-8 for a full description of projects financed by oil overcharge funds).

Energy Shortage Management and Emergency Preparedness

As part of the agency's energy shortage and emergency activities, the Energy Office routinely monitors supplies and potential disruptions. Minor fuel outages are expected

State Energy Conservation Program

Since the inception of the State Energy Conservation Program, the federal government has granted funds on an 80/20 matching basis to the states. In 1994-1995, Nebraska received \$187,400 in federal funds which were matched with \$37,480 in state severance tax funds.

In 1994-1995, State Energy Conservation Program projects included:

- Federally-mandated projects
- Oil overcharge project management

Gasoline Equivalent Saved by State Energy Conservation and Energy Extension Service Programs, 1985-1994 (Millions of Gallons)

Project Type	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Agricultural Energy Management	0.496	0.744	0.992	1.240	1.240	1.400	1.400	1.400	1.400	1.400
Dollar and Energy Saving Loan Program	0	0	0	0	0	0.134	0.739	1.232	1.463	2.379
Hundred Points of Light	0	0	0	0	0	0	0	0.247	0.345	0.350
Municipal Loan Programs	0	0	0	0	0	0.011	0.018	0.039	0.072	0.099
Nebraska Community Energy Management Program	0.248	0.336	0.384	0.384	0.392	0.392	0.392	0.388	0.388	0.389
Omaha Traffic Program	0	0	0	0	1.803	1.803	1.803	1.803	1.803	1.803
Public Buildings	0	0	0	0	0	0.003	0.083	0.083	0.083	0.083
Ride Share	0	0	0	0	0	0	0	0.032	0.049	0.048
Thermal Lighting Standards	11.072	14.904	18.768	22.368	26.080	30.144	33.304	36.840	40.544	44.664
Total Gallons of Gasoline Saved (in millions)	11.816	15.984	20.144	23.992	29.515	33.887	37.739	42.064	46.147	51.215

Source: Nebraska Energy Office

Figure 1

during planting and harvesting times. Monitoring is more intense during times when seasonal demands are high because of sudden weather changes.

In 1994-1995, the state was relatively free of major disruptions to electrical power supply caused by extreme weather conditions. However, in November 1994, the adequacy of coal supplies at Nebraska Public Power District's generating stations at Sutherland and Hallam were of concern. Low sulfur coal from Wyoming is the major resource used by the state's electrical utilities. Because of increased demand for low sulfur coal, bottlenecks developed delaying coal shipments to the state's largest electric utility. The coal supply problem was exacerbated because the utility's nuclear station, Cooper, had been closed since June 1994.

Energy Policy Implementation

In 1992, the Energy Policy Council forwarded to the Governor the *Nebraska Energy Policy Plan: Recommendations to the Governor* for his consideration.

By the end of that year, the Governor announced the first energy policy plan for the state — *An Energy Action Plan for Nebraska*. The *Action Plan* served as the first step in an on-going process to plan and implement effective programs to advance conservation and efficient use of traditional, nonrenewable energy sources, encourage the development of alternate and renewable energy sources and further energy-related economic development.

During the past two-and-a-half years, the Energy Office has undertaken the *Action Plan's* 20 objectives.

Education and Information Services

Education is needed by consumers to make sound energy decisions. The Energy Office identified and delivered educational opportunities and information resources through a coordinated statewide effort.

The agency published and distributed the *Nebraska Energy Quarterly* to thousands of Nebraskans. The *Quarterly* highlights a variety of energy conservation projects and topics. Two mandated agency publications, the *Annual Report* and *Nebraska Energy Statistics*, were also produced.

In 1993, the Energy Office established an Energy Education and Information Center as a means to centralize, organize and disseminate education and information resources to the general public. In 1994-1995, the Center's curriculum and related educational resources were transferred to the Nebraska Math and Science Initiative to support statewide energy education activities.

Oil Overcharge Funds

Since 1982, Nebraska has been receiving oil overcharge funds (sometimes referred to as Petroleum Violation Escrow Funds) as a result of various court actions against oil companies that overcharged their customers during the period of federal price controls from 1973 to 1981. Since direct compensation to injured consumers seemed unrealistic, the courts ordered that the money recovered from lawsuits be distributed to the states to fund programs that provide indirect restitution to injured energy consumers. States were directed to use the money, within parameters established by the courts, to fund energy assistance and conservation programs.

Nebraska Energy Settlement Fund A Summary of Exxon, Stripper Well and Diamond Shamrock Oil Overcharge Funds as of June 30, 1995

	Exxon	Stripper Well	Diamond Shamrock	Total
Total Received	\$15,504,944	\$13,739,760	\$359,172	\$29,603,876
Interest Earned	7,999,997	4,443,935	186,630	12,630,562
Total	\$23,504,941	\$18,183,695	\$545,802	\$42,234,438
Funds Budgeted				
Contracts	\$4,216,359	\$6,837,000	\$0	\$11,053,359
Program Development	103,692	0	6,434	110,126
Monitoring/Evaluation	346,308	0	0	346,308
Education	368,098	0	0	368,098
Load Management	50,039	0	0	50,039
Attorney General Legal Fees	0	299,327	0	299,327
Bank Wire Fees	0	98	0	98
Low Income Weatherization	4,018,725	3,190,528	0	7,209,253
Emergency Preparedness	45,907	0	0	45,907
Dollar & Energy Saving Loan Program	12,434,919	6,155,081	0	18,590,000
Loan Program Delivery	740,970	0	0	740,970
Special Projects	292,319	0	0	292,319
Designated Interest	787,605	1,191,232	0	1,978,837
Oil Overcharge Administration	0	384,199	526,868	911,067
Direct Restitution Project	0	0	12,500	12,500
Governor's Overcharge Plan '90	100,000	0	0	100,000
Uncommitted Balance	\$0	\$126,230	\$0	\$126,230
Allocated to Low Income Programs	\$0	\$126,230	\$0	\$126,230

Source: Nebraska Energy Office

Figure 2

Oil Overcharge Contracts

Exxon

Category	Allocated Funds	Contracts Issued	Expenditures Through June 30, 1995
Energy Education	\$1,573,490	\$1,205,392	\$712,633
Financing Demonstrations	1,102,198	1,102,198	915,646
Agriculture	291,276	291,276	291,276
Feasibility Studies	187,993	187,993	187,993
Building Improvement Demonstration	729,499	729,499	729,499
Transportation	700,000	700,000	700,000
Load Management	50,039	50,039	50,039
Dollar and Energy Saving Loan Program	12,434,919	12,100,776	12,100,776
Low Income Weatherization	4,018,725	4,014,500	4,014,500
Total Exxon Contracts June 30, 1995	\$21,088,139	\$20,381,673	\$19,702,362

Stripper Well

Category	Allocated Funds	Contracts Issued	Expenditures Through June 30, 1995
Low Income Weatherization	\$3,190,528	\$2,259,584	\$2,192,898
State Buildings Energy Team	810,000	115,666	115,666
Local Government Energy Management Circuit Rider	400,000	400,000	352,564
Public Transportation	800,000	800,000	790,540
Energy Related Biotechnology, Solar and Conservation Outreach	2,000,000	2,000,000	1,727,717
Greenhouse Project	400,000	400,000	400,000
Innovative Energy Grants	100,000	50,000	19,070
Dollar and Energy Saving Loan Program	6,155,081	2,841,851	2,841,851
Indian Tribal Governments	77,000	77,000	68,472
University of Nebraska Building Weatherization	500,000	500,000	497,136
Nebraska State College System	1,500,000	1,500,000	1,424,831
Curtis Weatherization	250,000	250,000	220,038
Total Stripper Well Contracts June 30, 1995	\$16,182,609	\$11,194,101	\$10,650,783

Source: Nebraska Energy Office

Figure 3

The agency's three programmatic divisions — Energy Financing, Energy Projects and Weatherization — manage projects financed by oil overcharge funds.

The Nebraska Energy Settlement Fund

The Nebraska Energy Settlement Fund was established by the Legislature for money paid to Nebraska from overcharge cases since March of 1986. Total funds (including interest) received as of June 30,

1995, were \$42.23 million: \$23.50 million in Exxon funds, \$18.18 million in Stripper Well funds and \$.55 million in Diamond Shamrock funds (see figures 2 and 3 for specifics on how the funds have been used).

percent in Nebraska — must be used for benefits to low income Nebraskans. Stripper Well funds totaling \$57,241 will be added to the Low Income Weatherization Assistance Program for free residential weatherization services. For more information on this program, see pages 9-10.

Specific Oil Overcharge Projects

Activity this year for each oil overcharge project financed by the Nebraska Energy Settlement Fund, reviewed by the Legislature and approved by the U.S. Department of Energy is described on this page and those that follow in this section.

College of Technical Agriculture Building Weatherization

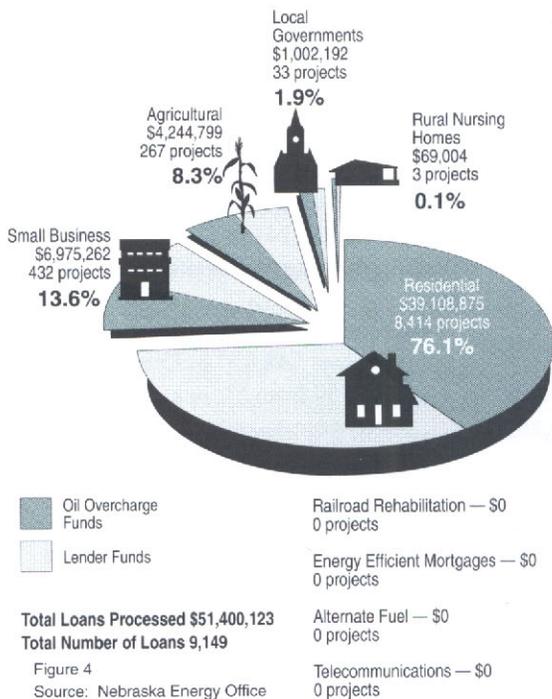
The University of Nebraska College of Technical Agriculture at Curtis finished a \$250,000 project to weatherize campus buildings. During 1994-1995, the College completed a series of energy conservation projects in the dormitories. The work

1994 Predisbursement Plan

In July 1994, the agency submitted for legislative review, a predisbursement plan totaling \$2,557,241 in Exxon and Stripper Well funds. The plan contained three parts:

- **Railroad Rehabilitation Fund** This fund combines \$48,850 in Exxon and \$451,150 from Stripper Well oil overcharge accounts to provide low-interest loans to finance rehabilitation of light density rail lines including repair of railroad track, bed and bridges and the purchase of energy efficient equipment for use on light density lines. This fund will operate as part of the Dollar and Energy Saving Loan Program.
- **Energy Efficient Mortgage Fund** Two million dollars in Stripper Well funds would be used to provide low-cost mortgage loans for the purchase of residences that meet higher energy efficiency standards than are presently in effect in the state. It is expected that this fund could lower the mortgage interest rate between one-fourth and one percent. The fund will operate as part of the Dollar and Energy Saving Loan Program.
- **Low Income Weatherization Assistance Program** Under the conditions of the Stripper Well court order, an equitable share of the funds — 18

Oil Overcharge Funds Invested in Types of Dollar & Energy Saving Loans as of June 30, 1995



The most common improvements in homes, apartments and small businesses are replacing furnaces, air conditioners and windows.

Popular agricultural improvements include installing low-pressure irrigation systems, replacing irrigation pumps and motors, making well modifications and replacing grain dryers. City and county governments and schools are generally replacing boilers, furnaces and installing heat pumps.

This year, the financing of railroad rehabilitation and energy efficient mortgages was added.

Some energy-saving improvements require an energy audit before a borrower may be approved for a loan. These improvements may be financed for up to five, ten or fifteen years depending on the type of improvement, its cost and the amount of energy saved. Loans are also available directly from the Energy Office at no interest for energy audits.

Applicants can obtain appropriate forms from the Energy Office, participating lenders, utilities or equipment dealers. After obtaining bids, applicants then submit loan forms to participating lenders at one of 676 sites across the state. Once a lender approves the loan application, a commitment agreement is submitted to the Energy Office for review. On final approval from the agency, the lender

included installation of storm windows, temperature controls and steam traps. Steam tunnel pipes, steam lines and attic joists were also insulated. *Stripper Well* funds totaling \$231,860 were spent on this project.

Dollar and Energy Saving Loan Program

Exxon funds totaling \$12.43 million plus \$6.16 million in *Stripper Well*, \$.13 million in *Amoco*, \$.07 million in *Coline*, \$.73 million in *National Helium* and \$.16 million in *Vickers* funds have capitalized the Dollar and Energy Saving Loan Program, which provides low-interest loans to Nebraskans to finance home, building, transportation and system improvements. More than 325 participating lenders provide six percent interest rate financing for up to fifteen years on loans for energy saving improvements.

notifies the applicant to proceed with the energy improvement.

Since the loan program began more than four years ago, 9,149 project loans have been made. More than \$27.23 million in oil overcharge funds (\$17.68 million plus loan repayments) have leveraged in excess of \$24.17 million from the state's private lenders. A total of more than \$51.4 million in low interest loans have been used to finance energy saving projects (see figure 4).

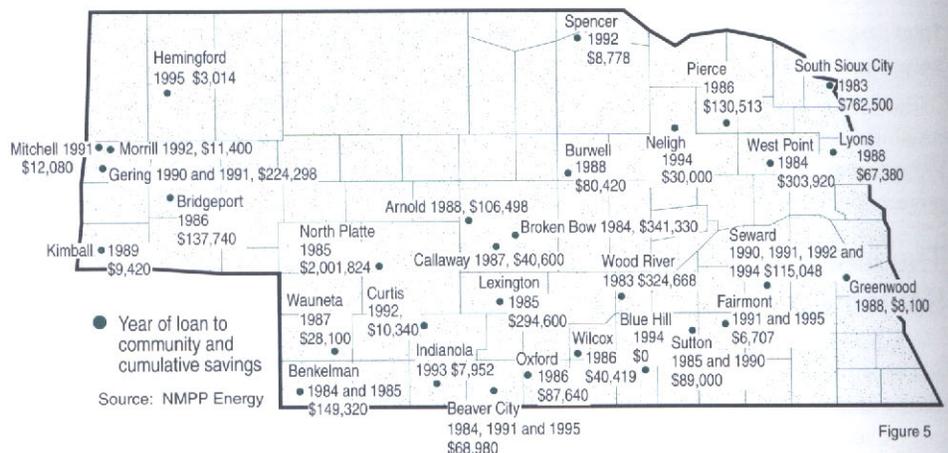
Electrical Load Management Resource Fund

Created in 1983, the Electrical Load Management Resource Fund is capitalized with \$50,000 in *Exxon* oil overcharge funds. Under contract, NMPP Energy manages the loan applications and repayments.

The fund offers interest-free gap financing to the 90-plus Nebraska utility members of NMPP Energy to help purchase, install or upgrade load management systems. These systems allow utilities to monitor and reduce peak demand, save energy and avoid being charged for expensive electricity used during peak times.

Over the 13 years of operation, the initial capital investment of \$50,000 has revolved more than eight times, saving ratepayers in the participating towns more

Cumulative Savings of Communities Borrowing Electrical Load Management Resource Funds 1983-1995



Total Estimated Savings to Date \$5,502,584

than \$5.5 million (see figure 5). Communities that install load management systems continue to earn additional savings during the lifetime of the equipment.

In 1994-1995, three new loans were made:

- Beaver City, \$12,000
- Fairmont, \$12,000
- Hemingford, \$11,000

Energy Management Circuit Rider

Stripper Well funds totaling \$400,000 financed a pilot project to provide energy management assistance to cities, counties, school district, hospitals and nursing homes in two areas of the state. The Circuit Rider Program operated within the jurisdictions of two community colleges — Central in Columbus and Mid-Plains in North Platte.

Circuit riders helped institutions and communities develop self-supporting energy management programs, identify necessary energy improvements and utilize energy accounting systems. The North Platte-based program ceased in 1993.

Under an additional \$20,000 *Exxon*-funded contract, the program based in Columbus was extended as it transitioned itself to self-supporting status. An alternate fuels program has also been established as a component of this circuit rider effort.

All the \$420,000 in oil overcharge funds committed to this project have been spent.

Green Lights

Fifty thousand dollars in *Exxon* funds (unspent monies from Hundred Points of Light) and \$150,000 in *Stripper Well* funds (from the State Buildings Energy Team which never became operational) were allotted to create a state-level Green Lights effort.

An additional fifty thousand dollars in *Exxon* funds were added to the Green Lights effort during the reporting period. These previously-approved funds were transferred from the Oil Overcharge Special Projects fund.

Green Lights is a national U.S. Environmental Protection Agency effort

focused on using state-of-the-art lighting technologies in commercial and governmental buildings to reduce energy, costs and pollution.

For the past three years, university architecture and engineering students have been conducting lighting surveys of the state's 2,760 buildings, identifying what lighting improvements would be most cost-effective. An estimated 90 percent of the lighting in the state's buildings is expected to be analyzed by fall 1995.

Based on earlier findings, it is estimated the state could save more than \$2.1 million annually from electricity and maintenance costs after the cost-effective lighting changes are made.

To increase the number of state buildings surveyed, the agency contracted with eight state agencies to pay for the cost of the lighting surveys: Game and Parks, \$4,612; Department of Corrections, \$4,612; Department of Roads, \$7,543; Peru State College, \$1,200; Chadron State College, \$1,200; Department of Public Institutions, \$6,824; University of Nebraska Medical Center, \$2,000, and University of Nebraska-Omaha, \$1,000. The eight contracts totaled \$28,991 of which \$12,456 was spent. Since the effort began in 1992, \$59,535 in oil overcharge funds and \$12,456 in contract costs, totalling \$71,991 have been spent.

Hundred Points of Light

A quarter of a million dollars in *Exxon* funds was budgeted for subsidizing the replacement of incandescent bulbs with compact fluorescent lamps. Compact fluorescent bulbs require only one-quarter the energy to produce an equivalent amount of light. They are more expensive, but last up to ten times longer, often paying for themselves in one or two years.

In 1992 and 1993, the state's two largest electric providers — Nebraska and Omaha Public Power Districts — cooperated with the Energy Office to subsidize placement of 28,000 compact fluorescents bulbs in over 860 commercial businesses. The five dollar subsidy was equally shared by the agency and the utilities. The Energy Office spent \$83,014 on this completed project.

In this reporting period, Lincoln Electric System continued a \$20,000 effort to demonstrate lighting efficiency technologies in local businesses. After a year's use, the utility will report on energy and cost savings as well as owner satisfaction. The Energy Office has spent \$4,211 on this project.

Fifty thousand dollars was allocated to the Green Lights program. For more information on this activity, see the previously detailed report above.

Of the remaining \$116,985, \$112,774 is uncommitted.

Innovative Energy Grants

Stripper Well funds totaling \$100,000 were available for grants to individuals for research and/or development of energy-related inventions.

In this program's six years, 33 preapplications have been received. Of those, 11 have been invited to complete the full application. Six of the 11 were reviewed by the University of Nebraska for technical feasibility. The Energy Office, along with the University's Technical Assistance Center, developed evaluation criteria for project review.

A \$50,000 grant was awarded to Grain Systems of Elm Creek in 1993 to complete the design and fabrication of a prototype grain dryer which utilizes a heat pump to dehumidify drying air which circulates in a closed loop. Work continued on this project.

During this reporting period, a new \$25,000 grant was awarded to S-Arrow of Hastings to demonstrate a catalyst-enhanced pyrolysis process using waste tires. The process is expected to produce a fuel gas with higher energy content than that produced by typical pyrolysis.

Landlord Loan Program

This program, a component of the Dollar and Energy Saving Loan Program, was financed with \$50,000 in *Exxon* funds and \$50,000 from a 1991 U.S. Department of Energy incentive grant.

Since this program is operated by the Weatherization Division in the agency, a more complete report on this program appears on page 10.

Lincoln Energy Conservation Interest Subsidy and Rebate Program

This local subsidy and rebate program ended in 1991. Since some loans were retired earlier than planned, not all subsidies were fully utilized by the borrowers. Unused subsidies are returned to the Energy Office and totaled \$4,191 in 1994-1995.

Lincoln's Innovative Energy Technology

Lincoln and Lancaster County's District Energy Corporation received \$1,900 in *Stripper Well* funds to produce a brief videotape on the city's innovative district energy system and thermal energy storage facility.

During the reporting period, the videotape was completed for a total of \$1,347.

Low-Income Weatherization Assistance Program

A total of \$7.21 million in oil overcharge funds (\$4.02 million from *Exxon* and \$3.19 million from *Stripper Well*) have been allocated to the Low-Income Weatherization Assistance Program to assist low-income Nebraskans with residential weatherization to reduce energy use and costs. In 1994-1995, \$12,355 in *Exxon* and \$545,434 in *Stripper Well* funds were spent through the program.

The terms of the *Stripper Well* court order mandate that an equitable share of the funds be set aside for the state's low-income population. To date, \$2,192,898 in *Stripper Well* funds have been spent.

For more detailed information about the Low-Income Weatherization Assistance Program, see pages 9 and 10.

Native American Tribal Governments

The *Stripper Well* court order requires the state to provide an equitable share of oil overcharge funds to Native American tribal governments. Based on the number of Native Americans in the state, \$77,000 have been set aside for eligible projects suggested by the tribal governments.

In 1994-1995, the agency spent \$25,666 to add roof insulation in three community buildings belonging to the Winnebago Tribe in Nebraska. A total of \$8,528 remains for Native American projects.

Nebraska OnLine Support

The state's information and communication system, Nebraska OnLine, received \$60,000 in *Exxon* funds to partially defray long-distance telephone charges. The information system is operated by the Nebraska Library Commission.

During this reporting period, a total of \$42,864 was spent on long-distance charges.

Nebraska Recreational Trails Plan

Seventy-five thousand dollars in *Exxon* funds, under contract to the state's Department of Economic Development, was used to survey existing trails and potential trail corridors, prepare a state trails plan and determine the feasibility of implementing the plan. Nebraska must have a plan to be eligible to apply for available federal recreational trails funds. Approximately 1,000 copies of the plan and 835 copies of an executive summary of the plan were distributed throughout the state.

In completing this project, \$74,546 have been spent. The state economic development agency provided \$8,631 as in-kind match. Other state agencies and natural resource districts provided \$10,650 to print the recreational trails plan.

Nebraska State College System

A total of \$1.5 million in *Stripper Well* funds was allocated for energy conservation projects at the state colleges. To date, the college systems' Board of Trustees has designated funding for three projects: \$986,777 for construction of a wood-fired boiler at Chadron State College which was completed in 1992, \$45,000 for development of a comprehensive utilities plan for Peru State College and \$468,223 for building weatherization at any of the three campuses.

In 1994-1995, an additional two building improvement projects were selected. In this reporting period, eight building projects were completed.

Of the \$1.5 million, \$1,424,831 have been spent. The balance of these funds are committed to weatherization projects that are scheduled for completion in fiscal year 1995-1996. The State College System is also providing \$18,000 in matching funds.

Planning, Monitoring and Evaluating Oil Overcharge Programs

To comply with federal and court reporting regulations, \$384,199 in *Stripper Well* and \$450,000 in *Exxon* funds have been committed for planning, monitoring and evaluating programs funded with oil overcharge dollars. In 1994-1995, a total of \$45,751 (\$8,258 in *Stripper Well* and \$37,493 in *Exxon* funds) were spent.

Rural Revitalization: Public Transportation

A total of \$1 million — \$200,000 from *Exxon* and \$800,000 from *Stripper Well* — were used for two rural transportation projects: bus subsidies which ended in 1992 and the purchase of alternate fuel vehicles.

During 1994-1995, an energy saving analysis of the 39 mini-buses and alternate fueled passenger vans purchased earlier was completed. The study was conducted by the University of Nebraska and the state's Department of Roads.

Overcharge funds totaling \$990,540 have been spent in completing this project.

Schuyler Energy Conservation Loan Program

Schuyler city government and its Energy Commission continued to operate a low interest energy conservation loan program for homes, businesses, nonprofits and governmental buildings.

The loan pool was capitalized with \$178,007 in *Exxon* funds and \$199,500 from local lenders.

To date, ten commercial loans totaling \$148,272 and 111 residential loans totaling \$303,111 have been made. The program is scheduled to operate through 1997.

Funds expended to date for program operations total \$58,712. The city has provided \$47,468 as in-kind match.

In 1994, Schuyler teamed \$25,000 in local keno revenues with \$50,000 from two local lenders to match \$75,000 in *Exxon* oil overcharge challenge loan funds from the Energy Office. This \$150,000 in no-interest funds leverages an equal amount from local lenders. The city then makes four percent energy conservation loans to local residents and businesses under the Dollar and Energy Saving Loan Program.

South Sioux City Energy Conservation Loan Program

The South Sioux City Area Chamber of Commerce completed its low-interest energy conservation loan program for commercial buildings during 1992-1993.

The loan pool was capitalized with \$132,000 in *Exxon* funds and \$66,000 from local lenders. An additional \$6,664 in *Exxon* funds was allocated for program operations. Nine projects were completed, using loan funds totaling \$77,332. Operating expenses totaled \$1,203. The local Chamber of Commerce provided \$2,200 as in-kind match. Loan repayments will continue through the year 2000. The portion of the loans being repaid to the Energy Office continues to accrue in the project's account until all loans are repaid.

State Building Revolving Fund

Four hundred thousand dollars in *Stripper Well* funds was added to other funds — \$150,000 in *Stripper Well* funds from the state's Green Lights program and \$250,000 in *Stripper Well* funds from the Innovative Grants Program — to create a State Building Revolving Fund to partially finance lighting improvements identified in lighting surveys performed in state buildings.

The incremental cost of more energy efficient lighting improvements would be financed from two sources: a loan for one-half of the cost would come from the State Building Revolving Fund and one-half would be provided by the agency owning the building. However, some state buildings are eligible for grants from

the state's Task Force for Building Renewal. These grants could be used for one-half of the agency's share of the cost of the improvements.

At the end of June, \$114,209 in loans had been made from this fund.

Statewide Energy Education

Two hundred thousand dollars in *Exxon* funds have been dedicated to coordinate statewide energy conservation instruction in grades kindergarten through twelve. Entities involved in the effort include educational service units, educator professional organizations, the state's Department of Education and energy suppliers. The goal is to increase energy awareness and promote energy efficiency to future consumers.

In 1994-1995, a contractor assisted agency staff coordinate work on energy education activities. To date, \$26,708 has been spent for educational contractors and staff support.

Starting in 1993, the Energy Office joined with the Nebraska Math and Science Initiative to further energy education in the state. The Initiative is a group of educators across the state and staff from the University of Nebraska-Lincoln working to improve science and math education.

In 1994, the Energy Office committed \$500,000 in *Exxon* oil overcharge funds which matched an additional \$4.9 million grant for a total of \$10 million from the National Science Foundation to achieve excellence in elementary and secondary math and science education.

During the reporting period, \$55,000 of the \$500,000 was committed to kindergarten through sixth grade education. Education workshops for more than 250 teachers were held. Fifty-four teams of teachers shared nearly \$25,000 in grants for specific energy classroom projects.

The Energy Office committed the balance of the \$500,000, \$445,000, to continue kindergarten through sixth grade teacher training and grants through 1997, develop teacher training and community science grants for grades 7-12, explore energy education specific distance learning opportunities for rural schools and provide internship opportunities in energy organizations for teachers.

The Initiative will operate the agency's energy education resource library and maximize use of the Internet for locating and distributing energy education resources.

Stuart Energy Conservation Loan Program

While this local commercial loan program ceased making new loans in 1991, repayments from the borrowers will continue beyond the beginning of the next century. The portion of the loan funds being repaid to the Energy Office will continue to accrue in the project's account until all loans have been repaid.

University of Nebraska Energy-Related Research

The University of Nebraska received \$2 million in *Stripper Well* funds to further energy-related research. Projects selected must secure matching funds before qualifying for oil overcharge dollars.

Of twelve research projects, seven are completed. The five still continuing include:

- Dr. L. Davis Clements, University of Nebraska-Lincoln Chemical Engineering Department, received \$64,960 to prototype and optimize a system for removing plastics from institutional solid waste. If successful, this would allow pelletizing of waste into refuse-derived fuel which burns very cleanly. Matching funds for this research project were provided by the Western Regional Biomass Energy Program.
- Dr. Peter Jenkins, University of Nebraska-Lincoln Department of Mechanical Engineering, received \$856,740 for multi-faceted research to develop an engine fueled by a combination of diesel and ethanol or compressed natural gas. Nine hundred thousand dollars in matching funds consisting of materials and cash were provided by four out-of-state companies.
- Dr. Frazier Williams, University of Nebraska-Lincoln Electrical Engineering Department, received \$142,007 to study improved methods for insulating electrical switching systems. Better insulation allows transmission at higher voltages, which

decreases line loss. Matching funds totaling \$142,007 were provided primarily by the Electric Power Research Institute.

- Dr. Bing Chen, University of Nebraska-Omaha Department of Electronics Engineering Technology, received \$91,172 to study the use of roof ponds for cooling commercial buildings. A portion of the needed matching funds have been provided by Omaha Public Power District and several equipment and building material manufacturers.
- Dr. David Jones, University of Nebraska-Lincoln Department of Biological Systems Engineering, received \$170,000 to develop a binder using waste fluids from ethanol production. The binder is mixed with waste paper to produce fuel pellets. The match requirement of \$170,000 was met by a Nebraska research pioneer who donated both money and equipment.

Since the research projects began, \$1,727,717 in oil overcharge funds have been spent.

Other Energy Settlement Funds

Not all oil overcharge funds are part of the Nebraska Energy Settlement Fund. Some of these funds have been held in escrow by the U.S. Department of Energy and are distributed only when a plan is submitted by a state energy agency and approved by the federal energy agency's Office of Hearings and Appeals.

Oil overcharge settlement funds resulting from fines levied against *Amoco*, *Palo Pinto*, *Vickers* and other oil companies fall into this category. According to the Department of Energy, all future settlement funds received by the state will be classified as *Stripper Well* funds and not subject to review by the Office of Hearings and Appeals.

Specific Oil Overcharge Projects

The status of each oil overcharge project financed with these miscellaneous funds is described on this page.

BERT Loan Program in Omaha

Omaha's Benson neighborhood was one of the last participants in the agency's community energy management program which ended in 1987. As a result of that program, the Benson Energy Resource Team — BERT — was formed and launched a revolving loan program to help homeowners and businesses finance energy saving improvements. The loan program was capitalized with \$90,000 in *Amoco* oil overcharge funds and ended in June, 1993.

The remaining funds were added to the Dollar and Energy Saving Loan Program. Loan repayments will continue and be returned to the Energy Office.

Statewide Energy Information Service

In 1992-1993, the Energy Office began to develop energy information services to assist consumers to make decisions resulting in the efficient and economic use of energy.

Funded with \$150,000 in *Amoco* funds, the agency began the process to develop and maintain a library collection. Displays on a variety of topics were developed or borrowed from other organizations. Informational materials were developed and distributed on energy topics at a variety of events. By the end of the fiscal year, \$77,869 were expended.

In early 1994, the agency issued a \$20,000 *Amoco*-funded contract for analysis of the present motor gasoline industry and its future options. At the end of the fiscal year, \$12,902 were spent on this project. The report was completed in the fall of 1994.

Nebraska State Fair Earthbound exhibits and promotional items cost the agency \$3,600 in 1994.

Weatherization Division

The Weatherization Division administers the Low Income Weatherization Assistance Program — a federally-funded program for weatherizing homes to save money and energy. The Energy Office is responsible for inspecting about 25 percent of the homes — about 400 — that are weatherized and for monitoring and auditing the subgrantees, primarily community action agencies, which actually make the home weatherization improvements.

Weatherization Funding Sources, 1979-1995

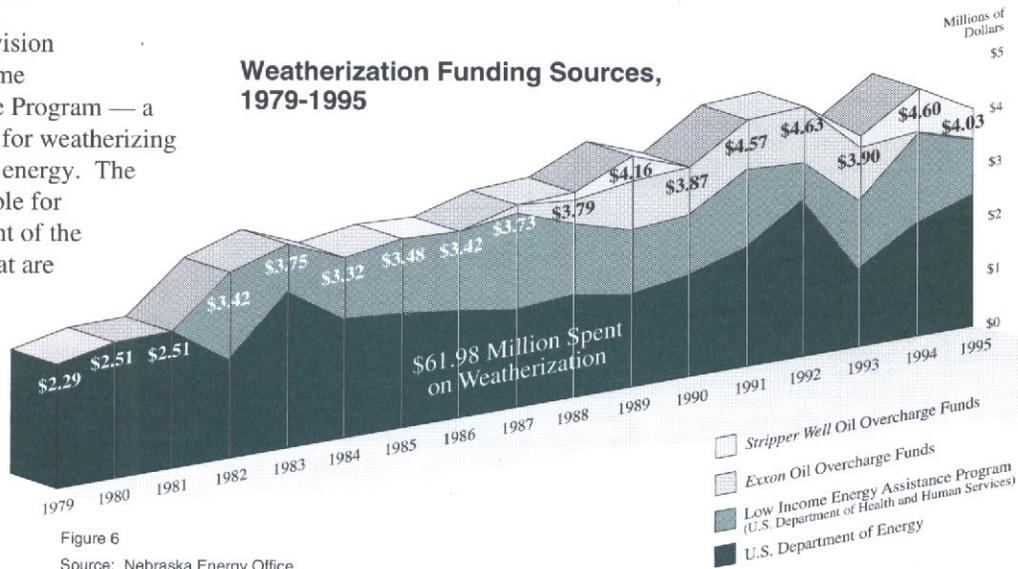


Figure 6
Source: Nebraska Energy Office

1994-1995 Highlights

In 1994-1995, total funding for the program was \$4,030,020. The Department of Energy's Low Income Weatherization Assistance Program provided a total of \$2,450,290 and the Low Income Home Energy Assistance Program, administered through the Nebraska Department of Social Services, supplied a total of \$1,021,941. The balance of the funding came from oil overcharge trust accounts — \$12,355 from Exxon and \$545,434 from Stripper Well.

Total funding for this activity decreased nearly 12.5 percent from the previous year. Decreases in funding from the federal Department of Health and Human Services and oil overcharge trust funds was partially offset by a funding increase from the U.S. Department of Energy. The only overcharge funds remaining to be used by the Weatherization Assistance Program are Stripper Well monies. Figure 6 shows the funding amounts and sources since the program began in 1979.

Since 1979

Since the Low Income Weatherization Assistance Program began operation in the state in 1979, nearly \$62 million in federal and oil overcharge funds have been spent to weatherize the homes of low-income elderly, disabled and others.

In the past 16 years, 44,354 homes have received free weatherization (see figure 7). However, an estimated 63,000 Nebraska homes remain eligible for this service.

Number of Homes Weatherized by Sources of Funds, 1979-1995

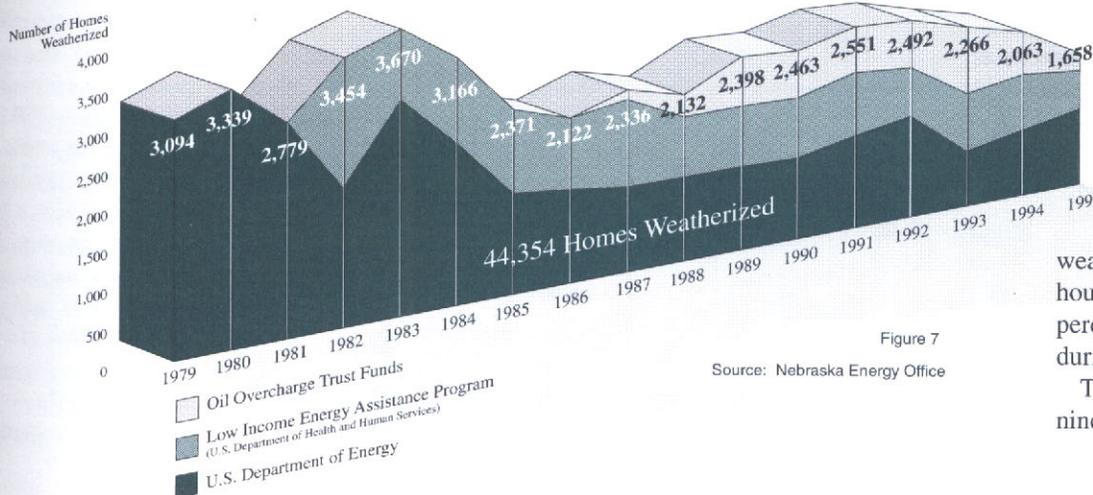


Figure 7
Source: Nebraska Energy Office

Homes Weatherized in 1994-1995

A total of 1,658 homes, were weatherized in fiscal year 1994-1995. In keeping with the agency's priority to serve Nebraska's elderly community through the Low Income Weatherization Assistance Program, the division weatherized 526 elderly households, or more than 31 percent of all homes improved during this period.

The map, figure 8, shows the nine Weatherization Assistance

**Nebraska Weatherization Assistance Program
Service Areas and Homes Weatherized
July 1, 1994 - June 30, 1995**

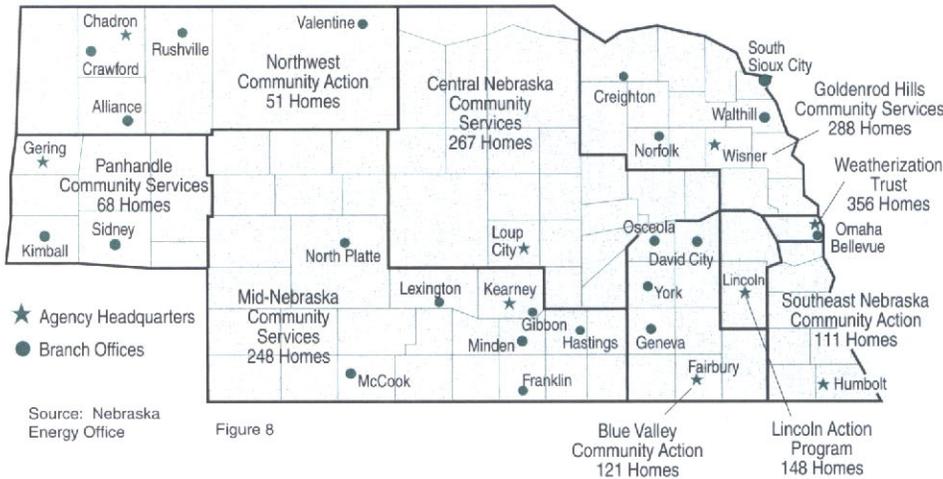


Figure 8

the Dollar and Energy Saving Loan Program. Replacement furnaces in single-family rental homes may also be financed under the program. To date, no loans have been requested.

Regional Training

In May 1995, more than 250 weatherization professionals from four Midwestern states gathered in Lincoln for a four-day training conference. This was the first time the conference had been held in Nebraska.

Conference participants learned how to improve aspects of the Low Income Weatherization Assistance Program at the local level.

The conference was financed with a U.S. Department of Energy grant of \$87,278. However, only \$50,289 was spent on conference activities. The funds remaining in the grant, \$36,989, have been set-aside to provide training opportunities for weatherization professionals in Iowa, Kansas, Missouri and Nebraska. The Energy Office will administer these training funds.

During the reporting period, the agency also received a \$10,000 grant from the regional office of the federal energy agency to provide technical training for weatherization professionals in the region. Since no training was provided during the period, these funds will be used in 1995-1996.

Program service areas and the number of homes weatherized in each area from July 1, 1994, through June 30, 1995.

Home improvements made through the program saved Nebraskans a total of \$197,857 in avoided energy costs during 1994-1995. The home improvements represent a one-time investment that most likely will yield a rate of return for at least twenty years.

Oil Overcharge Projects

Several years ago, the Energy Office was awarded a \$50,000 federal incentive grant to establish an innovative loan program for landlords as a part of the Weatherization Assistance Program. To these funds, the agency added \$40,000 in Exxon oil overcharge funds and \$10,000 in Exxon Special Projects (oil overcharge) funds.

Because of modifications in the program's rules, landlords owning multifamily housing (two or more units in the same building), were required to pay half the cost of weatherization improvements.

To provide financing for landlords who may need assistance in sharing the costs, the \$100,000 Landlord Loan Program was created and is operated in conjunction with

"Insulation [done under the Weatherization Program] is one of the simplest and least expensive ways to save energy. It's an investment that yields results right away," Senators Jim Exon and Bob Kerrey said.

Filmore County News
June 30, 1994

Energy Financing Division

The Energy Financing Division operates federal and state programs which finance energy improvements in homes, businesses, farms and ranches, nursing homes, government buildings, schools and hospitals:

- School District Energy Efficiency Program
- Institutional Conservation Program
- Dollar and Energy Saving Loan Program
- State Building Revolving Fund

A full report on the Dollar and Energy Saving Loan Program and State Building Revolving Fund is found on pages 4 and 7 respectively.

Collectively, these programs are designed to reduce the cost and use of energy in buildings and systems. During the time these programs have been in existence, Nebraskans have saved millions of dollars through more efficient use of energy resources.

School District Energy Efficiency Program

In 1981, the Nebraska Legislature created the forerunner to the School District Energy Efficiency Program — the first on-going state-supported program to weatherize kindergarten through twelfth grade public schools in the nation. For the first four years, only matching grants for energy conservation building improvements were given. In 1985, grants of up to \$2,500 per school for engineering studies were added. Beginning in 1986, the energy conservation improvements portion of the program was converted from grants to no-interest loans.

In 1993, the Legislature broadened the types of financing to include loans for energy studies, for the purchase or

School District Energy Efficiency Program July 1, 1994-June 30, 1995

Energy Improvement Loans

Loan Inquiries

School	Number of Buildings	Amount
Blair Public Schools	1	\$426,347
Elimwood-Murdock Public Schools	1	\$34,766
Elwood Public Schools	1	\$38,072
Ewing Public Schools	1	\$9,940
Lisco Public Schools	1	\$8,065
Mead Public Schools	1	\$181,687
Omaha Public Schools	6	\$277,924
Totals	12	\$976,801

Loans Being Reviewed

School	Number of Buildings	Amount
Omaha Public Schools	1	\$45,498
Papillion-LaVista Public Schools	3	\$264,320
Totals	4	\$309,818

Loans Issued

School	Number of Buildings	Amount
Atkinson Public Schools	1	\$7,424
Auburn Public Schools	1	\$287,420
Bennington Public Schools	1	\$44,524
Brule Public School	1	\$6,824
Chadron Public Schools	1	\$34,902
Elba Public Schools	1	\$52,720
Elkhorh Public Schools	2	\$134,199
Elmwood-Murdock Public Schools	1	\$34,637
Filley Consolidated School	1	\$19,114
Hartington Public Schools	1	\$160,650
Loup City Public Schools	2	\$9,365
Minatare Public Schools	1	\$6,972
North Bend Jr./Sr. High School	1	\$168,000
Omaha Public Schools	11	\$193,554
Orchard Public Schools	1	\$21,947
Palmer Public Schools	1	\$7,378
Papillion-LaVista Public Schools	4	\$97,104
Ponca Public Schools	1	\$14,245
Shelton Public Schools	1	\$10,766
Sioux County High School	1	\$5,913
Superior Public Schools	1	\$45,060
Valley Public Schools	2	\$211,888
Wisner-Piager Public Schools	3	\$31,070
Totals	41	\$1,605,676

conversion of school vehicles to operate on alternate fuels and for installation of alternate fueling facilities.

For the first 11 years, state oil and natural gas severance taxes financed the program. Since 1991, the program has been self-supporting, making loans from a revolving fund capitalized from loan repayments and interest earnings.

Through June 1995, over \$29.2 million in grants and loans have been made to the state's public school systems to finance energy saving studies and building improvements.

Energy Office staff review applications for grants and loans, conduct technical reviews of the planned improvements, monitor progress of the building modifications, collect loan repayments and analyze energy consumption reports filed by the schools.

School District Energy Efficiency Program and Institutional Conservation Program Loans, Grants and Studies by County, 1994-1995

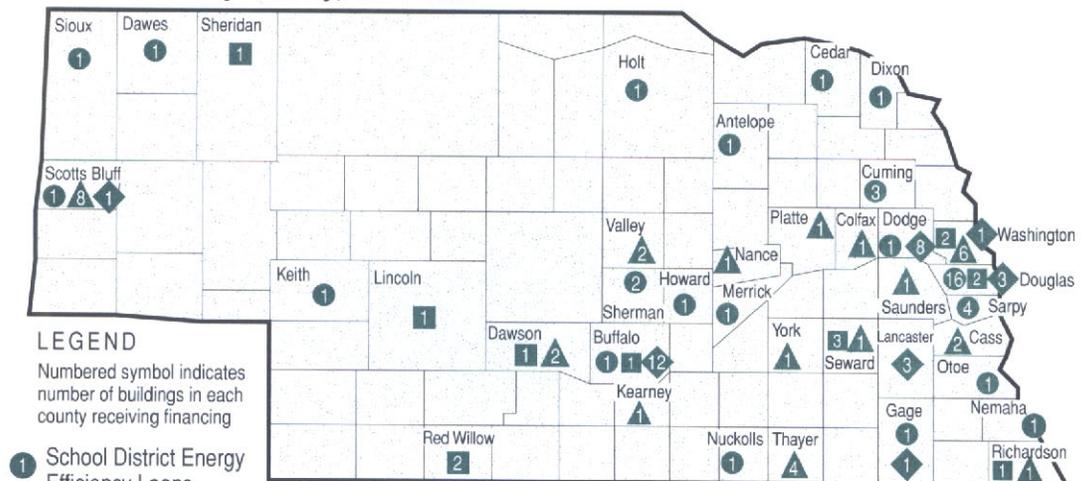


Figure 9

Source: Nebraska Energy Office

School District Energy Efficiency Program July 1, 1994-June 30, 1995

Engineering Study Grants

School	Number of Buildings	Amount
Benedict Public Schools	1	\$ 2,500
Blair Community Schools	6	15,000
Creston Public School	1	1,650
Dawson-Verdon Public Schools	1	2,500
Elmwood-Murdock Public Schools	2	3,450
Hebron Public Schools	4	9,900
Lexington Public Schools	2	5,000
Millard Public Schools	1	2,500
Minden Public Schools	1	2,500
Ord Public Schools	2	5,000
Richland Public School	1	2,350
Scottsbluff Public Schools	8	19,960
Shady Nook Public School	1	2,500
TOTAL — 13 School Districts	31 Buildings	\$74,810

dollar savings it receives from completing the improvement.

At the end of the reporting period, June 30, 1995, the program's loan pool contained \$13.2 million of which \$2.09 million was still available for loans and \$89,186 for engineering study grants. Currently, 145 school districts have 308 loans in repayment, totaling \$6.3 million. In 1994-1995, the agency approved loans for energy improvements for 41 buildings in 23 school districts amounting to \$1,605,676 and \$976,800 has been set aside for 12 more projects in seven school districts. Applications and inquiries are currently under review for four loans in two school districts amounting to \$309,818.

Projects funded through the loan program must have an anticipated payback period of less than their expected life. The loan period may be up to fourteen years. During 1994-1995, 19 school districts paid off loans totaling \$380,658.

The table on page 11 lists the school districts receiving loan funds in this period.

Engineering Study Grants

The School District Energy Efficiency Program also provides grants up to \$2,500 per building to finance an engineering study and report on the building and its energy-using systems. A registered professional engineer or architect must conduct the study, which identifies all potentially cost-effective conservation improvements, as well as energy-saving changes in operation and maintenance procedures.

During 1994-1995, the Energy Financing Division issued engineering study grants totaling \$74,810 to 13 school districts for studies in 31 buildings. The table above lists grant-receiving schools and figure 9 on page 11 identifies the location of the schools receiving the grants.

Since the grant portion of the program began in 1985, 452 grants totaling \$1,019,574 have been awarded to public school systems in the state.

Institutional Conservation Program

The Institutional Conservation Program provides 50/50 federal matching grants to nonprofit hospitals and public and private schools, either for engineering studies to identify cost-effective, energy-saving building improvements or for making energy improvements in the buildings.

In May, 1995, the Legislature voted to create a technology fund for the state's schools. The fund will be financed with proceeds from the School District Energy Efficiency Program which is scheduled to sunset in mid-1996.

No Interest Loans

From December 1986, through June 1995, over \$11.26 million in no-interest loans have been made for 333 projects across the state.

The loan portion of the program is designed so that a school district repays the loan with all or a portion of the energy

The Energy Office provides program information to applicants, reviews and ranks applications, submits project proposals to the U.S. Department of Energy for final review, monitors the progress of approved projects and collects energy use information after the project is completed.

Nearly \$9.9 million in federal funds have been awarded to the state's schools and hospitals since the program became operational in 1980.

Latest Grants

In August 1994, the U.S. Department of Energy awarded \$311,653 — \$71,394 for engineering studies on 29 buildings and \$240,259 for energy conservation improvements in 14 buildings. The projects being funded are expected to cost \$480,522, but are expected to save \$98,270 yearly in avoided energy costs. The table below lists recipients of both engineering study and energy improvement grants.

In January 1995, five schools and hospitals applied for \$16,615 for engineering study grants in ten buildings. Ten schools and hospitals applied for grants to fund energy saving building improvements estimated to cost \$523,732 in 26 buildings. However, only \$266,267 was available for projects and studies. Grants will be awarded by the federal government in August 1995.

Institutional Conservation Program Grants July 1, 1994-June 30, 1995

Institution	Number of Buildings to be Studied	Number of Buildings to be Improved	Grant Amount
Beatrice Community Hospital	1		\$5,250
Bennington Public Schools		1	25,682
College of Saint Mary	1		1,475
Dana College	1	2	61,910
Falls City Sacred Heart Schools		1	3,779
Gordon Elementary Schools		1	766
Gothenburg Memorial Hospital		1	10,350
Kearney Public Schools		1	15,375
Lincoln St. Johns Elementary School	1		1,000
McCook Community College		2	3,075
Mid-Plains Community College-North Platte		1	75,521
Midland Lutheran College	8		11,291
Omaha Holy Name Parish	1		2,360
Omaha Immanuel Medical Center	1		18,000
Omaha Roncalli High School		1	5,565
Seward Memorial Hospital		1	28,250
Southeast Community College-Millard		2	11,486
University of Nebraska at Kearney	12		20,982
University of Nebraska at Lincoln	2		4,550
University of Nebraska at Scottsbluff	1		4,986
TOTAL	29	14	\$311,653

Natural Gas Technical Assistance

About 30 percent of the state's natural gas consumers receive their service from one of 14 municipally-owned natural gas utilities. The remaining 70 percent receive natural gas from one of four investor-owned natural gas utilities — KN Energy, Midwest Gas, Northwestern Public Service and Peoples Natural Gas Company.

One town in Nebraska may be unique in the entire country and provide a glimpse into the world of tomorrow's natural gas service. Kearney has granted a franchise to two different investor-owned natural gas utilities to provide service to the town's residents. At this time, choice of service is limited to just larger natural gas customers.

Natural gas is imported into the state to the investor-owned and municipally-owned utilities primarily through major pipelines operated by Northern Natural Gas Company and KN Energy.

Municipal Natural Gas Regulation Act

Nebraska is one of only two states in the nation to regulate investor-owned natural gas suppliers at the local level. Village boards and city councils review rate requests under the state's *Municipal Natural Gas Regulation Act*. The Energy Office administers the Municipal Natural Gas Regulation Revolving Loan Fund, created by the *Act* to provide interim financing of rate regulation. The agency also provides technical assistance to communities as they perform their regulatory duties.

Revolving Loan Fund

The Municipal Natural Gas Regulation Revolving Loan Fund was initially capitalized with \$350,000 in oil and natural gas severance tax revenues. The fund finances local review of utility-initiated general rate requests and judicial review, if necessary. Groups of communities borrow from the fund to finance the rate studies and the fund is replenished in the same amount by the utilities, which in turn recover the cost of regulation from the ratepayers.

Regulations governing the loan fund were adopted and took effect in 1987.

1994-1995 Loan Fund Activities

In 1994-1995, three groups of communities and one town served by three different investor-owned utilities were involved in ratesetting activities financed by the Municipal Natural Gas Revolving Loan Fund:

- The February 1993 filing by KN Energy in the utility's entire service territory of 189 towns was resolved by negotiated settlement. The filing, the largest since passage of the *Act*, involved ten rate areas. Communities in a utility's service area are grouped in rate areas for regulatory and ratesetting purposes. The ten rate areas requested loans totaling \$235,223. The Energy Office recovered the entire cost of the loan from the utility.
- KN Energy also filed to establish a rate in Kearney which is also served by another investor-owned utility, Northwestern Public Service. The city received a loan for \$6,887. The city and the utility reached a negotiated settlement on the proposed rate. The utility reimbursed the Energy Office for the entire amount of the loan.
- Midwest Gas Company which serves two towns in northeast Nebraska filed for a rate increase in Dakota City and South Sioux City in November 1994. A loan for \$40,500 was requested. The towns reached a negotiated settlement on the rate with the utility. The regulatory costs only totaled \$11,108 which will be paid by the utility in 1995-1996.
- Northwestern Public Service requested a rate increase in the four towns the utility serves in central Nebraska — Alda, Grand Island, Kearney and North Platte. A loan for \$70,500 was requested by the utility. The four towns negotiated a settlement with the utility over the proposed rate increase. The total cost of regulation was less than anticipated, \$33,370. By the end of the reporting period, the utility had not yet reimbursed the loan fund.

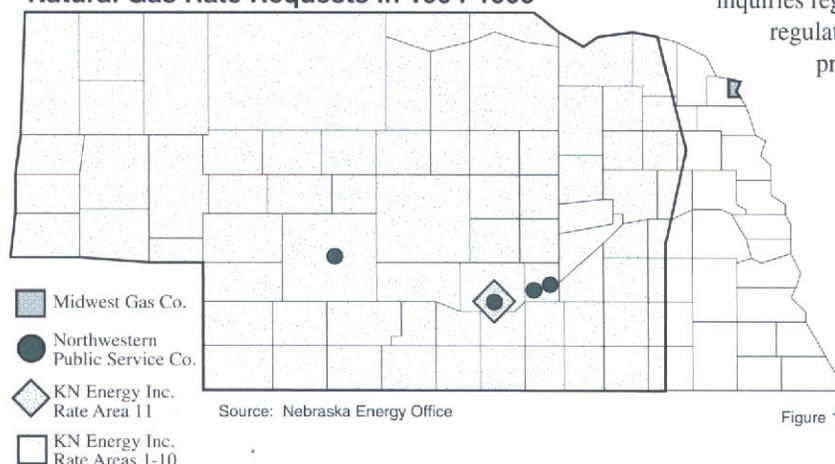
In 1994-1995, the Energy Office paid consultants \$58,994 for regulatory costs and recovered \$242,110 from the utilities. The Energy Office only recovers one dollar from the utility for each dollar spent by the communities during the regulatory process. Dollars spent and dollars recovered are usually unequal within any fiscal year since the regulatory process lasts, at a minimum, eight months.

Technical Assistance

Throughout the reporting period, the Energy Office provided assistance to municipal officials during all phases of the regulatory process as mandated by statute.

Typical kinds of assistance include organizing and providing support services for rate area committees, publishing periodic issues of the *Natural Gas Rate Regulation Update* in each utility's service area, issuing requests for proposals for professional services, providing informational broadcasts and responding to specific inquiries regarding the regulatory process.

Areas Receiving or Appealing Natural Gas Rate Requests in 1994-1995



Grants and Legislation

Grants

During the current reporting period, the Energy Office received several new one-time or project-specific grants for use by the agency or for regional groups. These new grants, totaling \$303,365 in 1994-1995, are detailed here and in specific sections as indicated.

U.S. Department of Energy Grants

The Energy Office continued to administer a \$100,000 grant received in 1992-1993 from the federal energy agency on behalf of the Governors' Ethanol Coalition to demonstrate the use of ethanol as an aviation fuel. For more information about this grant, see page 17.

A second grant for \$25,000 was received from the federal energy agency to revise and reprint an alternate fuel book which detailed the status of the development and use of various alternate fuels. The agency contracted with the Clean Fuels Development Coalition to revise the book which the organization had printed earlier. The revised publication, *Clean Fuels: Paving the Way for America's Future* was printed in early 1995.

A third grant totaling \$50,000 was received for use exclusively by the agency for a national effort, called Climate Wise, to prevent pollution. The competitive grant was awarded to only seven agencies or organizations in the nation. This two-year test attempts to recruit industries to voluntarily make energy efficiency improvements and develop pollution prevention strategies. During this reporting period, no funds were spent from this grant.

U.S. Departments of Energy and Agriculture Grant

The agency completed using the funds from a \$44,535 grant from these two agencies to the Governors' Ethanol Coalition. This grant was initially received in 1991-1992. For more information about this grant, see page 17.

U.S. Department of Energy Regional Grants

The Energy Office received \$87,278 from the regional office of the U.S. Department of Energy for conducting a four-state weatherization training conference. For more information about this grant, see page 10.

A \$1,250 grant from the regional office of the federal energy agency was received to be used by the Energy Office to promote the National Industrial Competitiveness through Energy, Environment and Economics program. The federal program provides funding to state and industry partnerships for projects that develop and demonstrate advances in energy efficiency and clean production technologies. Only \$382 of this grant was spent by the end of the reporting period.

A third regional grant totaling \$15,000 was received by the agency to further the use of alternate fuels by Nebraskans. This grant leveraged other funds to produce a Nebraska-specific alternate fuel handbook and a map of alternate fueling stations. By the end of the reporting period, \$12,675 of the grant had been spent. For more information about this grant, see page 16.

Western Regional Biomass Energy Program Grants

The Western Regional Biomass Energy Program is one of five regional projects across the country designed to develop short-term, cost-effective uses for biomass resources — renewable organic matter, including forest residues, agricultural crops and wastes, wood and wood wastes, animal wastes, livestock operations residues, aquatic plants and municipal wastes. Nebraska's region is administered by the Western Area Power Administration.

Two agency representatives serve on a program advisory board, which directs the regional program as well as specific projects.

During 1994-1995, the agency received three grants from the Biomass Energy Program totaling \$36,000.

- A \$6,000 grant was used to provide national satellite broadcast capabilities for a regional conference on renewable bioenergy resources to generate electricity. A videotape

summary of the conference will be produced in 1996. As of June 30, 1995, no funds from this grant had been spent.

- A \$15,000 grant was received by the agency to leverage other funds to produce a videotape detailing the state's use of biomass resources to produce ethanol. At the end of the fiscal year, none of these funds had been spent.
- The agency received a third grant for \$15,000 to continue research begun in early 1994 for increasing ethanol use in Midwestern states. The research examined the petroleum refining and distribution system and oxygenate production facilities — ethanol, methanol, methyl tertiary butyl ether and ethyl tertiary butyl ether plants — in a 15-state region. By the end of the current reporting period, a total \$35,000 had been spent on this research since the project began in 1994.

Environmental Protection Agency Grant

This federal agency asked the Energy Office to submit a grant request to develop a national training program on how to use student interns to perform lighting audits in institutional buildings. The federal agency gave the Energy Office \$103,837 to develop this training and provide workshops to interested individuals. By the end of the reporting period, \$41,947 had been spent.

Legislation

No significant federal energy legislation affecting Nebraskans was adopted by Congress during the reporting period.

But in 1994, the state's Legislature voted to create a technology fund for the state's public schools. The fund will be financed with proceeds from the School District Energy Efficiency Program that was scheduled to sunset in mid-1996.

Any remaining funds in the program — including loan repayments over the next 14 years — will be transferred to the School Technology Fund operated by the state's Department of Education to award grants to public schools for Internet connections.

Ethanol and Other Alternate Fuels

Historically, the role of the Energy Office in the development of alternate transportation fuels has been that of advocate and demonstrator. The Governor requested the agency, in its role of energy policy advisor, to take a more active role in coordinating the development and use of ethanol-based fuels, not only in the state, but around the country as well. In the past several years, the agency has been very successful in securing favorable policy treatment for ethanol and in locating funding for state, municipal and county transportation systems using alternate fuels.

1994-1995 Highlights

A number of issues and activities involved the agency as it fulfilled its role in fostering the growth of alternate transportation fuels, including ethanol.

America's Quest for Cleaner Transportation Fuels

With the passage of the amendments to the *Clean Air Act* in 1990 and the subsequent passage of the *Energy Policy Act* in 1992, cleaner burning fuels of all types became a national priority. Generally, the transportation fuel types considered "alternate" are biodiesel, electricity, ethanol, methanol, natural gas and propane.

For almost four years, various fuel producers, including the petroleum industry, have focused on the fuels and additives to be used in the carbon monoxide and ozone nonattainment areas of the country which are required to use cleaner-burning transportation fuels.

After a thorough review of the rules and regulations associated with the introduction of reformulated gasoline for use in the nation's smoggiest cities, the Environmental Protection Agency in December 1993 reaffirmed the earlier proposed rules with one exception — use of a renewable oxygenate would be required in 30 percent of reformulated

gasoline. The oil industry preferred using an oxygenate made from petroleum called methanol.

This new rule meant that ethanol would be a required oxygenate in a portion of reformulated gasoline. It was estimated that reformulated gasoline would account for one-third of all gasoline sold in the nation. Oxygenates are estimated to account for 650 million gallons annually in the 116 billion gallon gasoline market.

For the next six months, the EPA conducted several hearings. In June, 1994, the agency announced its decision — the rule would remain in place, but be phased-in over two years. Starting in 1995, only 15 percent of the oxygenates would come from renewable sources and in 1996, 30 percent.

Shortly thereafter, the American Petroleum Institute and other petroleum interests filed suit in federal court asking that the rule be set aside. During this reporting period, the court decided that the federal agency had exceeded its authority and could not require use of a specific oxygenate.

Nebraska's Quest for Cleaner Transportation Fuels

At the state level, the Governor's 1992 *Energy Action Plan* and the 26-member Alternate Fuels Committee serve as the guiding forces in increasing the use of cleaner-burning transportation fuels and reducing the state's overall dependence on petroleum-based fuels.

In 1994-1995, the Alternate Fuels Committee continued to work on an alternate fuels handbook and a directory of fueling stations. The Energy Office contributed \$1,670 from a U.S. Department of Energy regional grant and the state's Blue Flame, Power and Propane Associations plus Ethanol and Soybean Boards each contributed \$1,670 to the development of these publications. In 1994, the agency received a \$15,000 U.S. Department of Energy regional grant for *Nebraska Alternate Fuels Stations: A State Directory* and the *Nebraska Alternative Transportation Fuels Handbook*. The *Directory* was published in 1995.

Nebraska Ethanol Production Developments

In 1995, the state solidified its position as the number three ethanol producer in the nation. An estimated 16 percent of the state's annual corn crop is used to produce ethanol and other by-products. A total of seven operating plants are capable of producing up to 275 million gallons of ethanol annually, more than 18 percent of all ethanol produced in America. The plants employ 735 Nebraskans directly and an estimated 3,600 others indirectly — a total of 4,325 jobs.

Governors' Ethanol Coalition

During the reporting period, Nebraska Governor Nelson completed his second term as head of the Governors' Ethanol Coalition.

The Governor founded the organization in September 1991 and served the first year as chairman of the nine-state group. He was succeeded in 1993 by Illinois Governor Edgar. In 1995, Wisconsin Governor Thompson replaced Nelson. By 1995, 19 states were members of the ethanol policy and promotion group (Oklahoma, the 20th state, joined after the reporting period).

The goals of the organization are to increase the use of ethanol, to decrease the nation's dependence on imported energy resources, improve the environment and stimulate the national economy.

The Energy Office director is one of the Governor's representatives on the Coalition and the agency continues to serve as the administrative headquarters of the group, as it has since 1991.

Issues and Trends

Introduction

At least annually, the Energy Office is required to "identify emerging trends related to energy supply, demand and conservation and to specify the level of statewide energy need within the

The cost of the state's petroleum dependence remained unchanged — just over half of all energy expenditures in 1994 were for petroleum and its refined products used in the state.

Energy consumption, which rose dramatically in 1993, rose again in 1994 to an all-time record high of 561 trillion British thermal units.

All sectors — residential, commercial, industrial (including agriculture) and transportation — recorded increases in energy consumption. Commercial and industrial

sectors recorded the largest percentage increases, 11.7 percent and 5.8 percent, respectively. While energy use in the commercial sector set a record at 120.3 trillion British thermal units, the industrial sector, at 153.6 trillion British thermal units, remained below the record-setting period of 1975-1979. Contributing factors to the increases included a warmer, drier summer necessitating more cooling and irrigation needs. Residential use increased to 132.2 trillion British thermal units, a 2.5 percent rise and a new all-time record. Transportation energy use increased by only 1.5 percent to 154.9 trillion British thermal units and below the peaks set in the 1970s.

One of the most dramatic changes in 1994 was the amount of electricity sold to users outside Nebraska. After peaking at 51.2 trillion British thermal units in 1992, only 15.6 trillion British thermal units were sold in 1994, a nearly two-thirds reduction from 1993. The anomaly in sales is attributable to the continued shutdown at Cooper Nuclear Station in Brownville.

Separate energy use and production information is provided for electric producers in the Electricity portion of this section of the *Annual Report*.

Total Energy Expenditures, Nebraska, 1970-1994

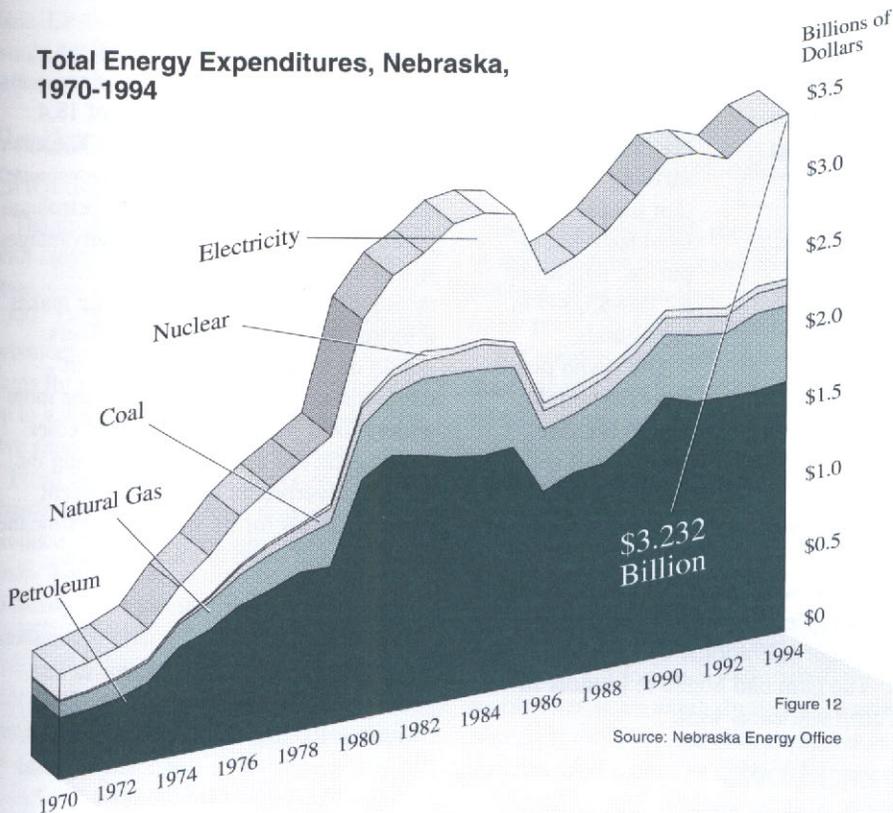


Figure 12

Source: Nebraska Energy Office

following sectors: agricultural, commercial, residential, industrial, transportation, utilities, [and] government..." This section addresses those requirements as well as chronicles international, national and state trends and issues.

Energy Costs and Consumption

For the fifth consecutive year, Nebraska's total energy bill surpassed \$3 billion — exactly \$3.232 billion in 1994 as shown in figure 12. A new all-time, record high was established, usurping last year's total of \$3.145 billion.

The Top Story: Nebraska's Soaring Ethanol Production

In 1994 and 1995, the energy issue affecting the greatest number of Nebraskans was the surge in ethanol production in the state. Not since the days of electric production from hydropower plants at the turn of the century has the state embraced an alternate energy form with such fervor.

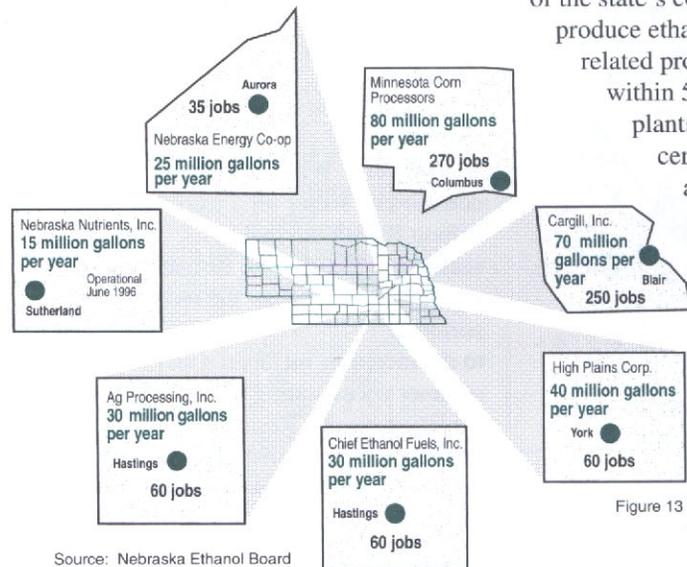
Key policy decisions in earlier years — eliminating the two cent tax exemption for ethanol at the fuel pump in exchange for in-state ethanol producer credits of 20 cents per gallon — played a major role in vaulting the state from the ranks of ethanol producer also-rans to the nation's number three ethanol producer.

Seven Plants — 275 Million Gallons

By the end of 1995, the state's seven operating plants — stretching from Blair on the Missouri River to Sutherland near the Colorado border — are expected to produce 275

million gallons of ethanol for the year. Production capacity may increase in 1996 depending on the continued operational capacity of the Sutherland plant. Sutherland is one of the state's earliest constructed plants, but has been plagued with design and legal problems.

Nebraska Ethanol Plants



Source: Nebraska Ethanol Board

It is estimated that in 1995, 16 percent of the state's corn crop will be used to produce ethanol, sweeteners and related products. For corn growers within 50 miles of processing plants, that adds five to ten cents per bushel, putting an additional \$8-\$16 million into farmers' pockets.

For corn growers farming 400 acres, that means corn used for ethanol puts an additional \$2,500-\$5,000 in their hands.

The seven plants currently employ 735 Nebraskans directly and an estimated 3,600

Figure 13

Nebraskans indirectly. A total of 4,325 owe their jobs to the state's newest growth industry.

One disappointment came in February 1995. Quadrex, which had hoped to open three plants producing 25 million gallon each in Central City, Kearney and Sutton, could not find the needed financing to have the facilities 25 percent operational by the end of the year to qualify for the state's producer tax credits. The firm had hoped to pioneer in using a feedstock that not only included corn, but crop wastes as well.

National Policy: A Year of Highs and Lows

At the very end of June, 1994, the Environmental Protection Agency gave ethanol a big, albeit temporary, boost by requiring that the renewable fuel additive be used in reformulated gasoline. Starting in January 1995, reformulated gasoline is required in nine severely polluted cities in the nation. It is estimated that as much as one-third of the nation's gasoline sold will be reformulated. EPA had proposed that after a phase-in period, 30 percent of all reformulated gasoline sold in the nation would be required to use ethanol as the oxygenated additive.

Within weeks, the American Petroleum Institute and petroleum refiners asked the federal Appeals Court to set aside EPA's plan saying that the agency had overstepped its authority. In September, the court issued an immediate stay, barring the agency from proceeding while the court considered the issue.

Other ethanol opponents chose non-judicial routes of action. In July 1994, a bill was introduced in Congress by New Jersey Senator Bradley to phase-out the federal tax credits for ethanol. Louisiana Senator Johnston attempted to legislatively

stop the Environmental Protection Agency from implementing the renewable requirement. With the Vice President casting the tie-breaking vote in August, the Senate defeated the Johnston amendment.

In October 1994, the federal Treasury Department provided a long-sought boost for the ethanol-based additive, ethyl tertiary butyl ether. The Treasury Department extended the federal tax exemption that ethanol gets — three cents per gallon from the federal tax of 18.4 cents per gallon — to the ether. The ether is a high octane, low-volatility oxygenate that can be transported through petroleum pipelines. One of ethanol's disadvantages is that the fuel cannot be transported through pipelines. This tax ruling makes it more likely that petroleum refiners would be willing to use the ether in oxygenated gasoline rather than the more widely used methyl tertiary butyl ether.

The effect of a 1991 law requiring the federal government to buy 10 percent ethanol blends for its vehicles anytime the price was the same or cheaper than

"It hardly comes as a surprise that the petroleum industry is fighting against the use of ethanol in our fuel. It has a lot at stake financially. Rural America has the same financial stake in this debate."

Editorial, *Grand Island Independent*
July 17, 1994

"The dawn of the ethanol era has given hope to U.S. citizens who believe energy independence is a possibility even in the most vehicle-dense nation on earth."

Editorial, *Kearney Hub*
August 11, 1994

gasoline came to light at the end of 1994. The Government Accounting Office found that before passage of the law, only one percent of the fuel purchased had 10 percent ethanol. By 1994, only 1.6 percent of the fuel purchased contained ten percent ethanol. In comparison, 7.1 percent of the fuel purchased by the public contains ten percent ethanol.

Beginning in 1995, reformulated gasoline — without the renewable fuel requirement EPA had suggested — went on sale in the nine smoggiest cities in the

nation. According to the National Corn Growers, ethanol as the oxygenate additive was used in only five percent of the reformulated gasoline.

In April 1995, a federal appeals court said that the Environmental Protection Agency exceeded its authority in proposing a rule requiring ethanol use in a part of all reformulated gasoline sold. In June, EPA announced that the agency would file an appeal with the U.S. Supreme Court over the renewable rule.

Producer Tax Credit Shortfall: A Solution

The producer incentive system, credited with creating an ethanol industry in the state, was approved by the Legislature in 1990. Under the plan, any in-state ethanol producer could receive a tax credit of 20 cents for every gallon of ethanol produced up to a maximum of \$5 million a year for five years — a total of \$25 million.

From the state, the producer receives a transferable gas tax credit that ethanol producers sell to petroleum marketers for cash. The marketers then use the credits to satisfy their gas tax liability to the state, creating a shortfall in the Highway Trust Fund. The state's Ethanol Producer Incentive Cash Fund reimburses the Trust Fund so that road construction can remain on schedule.

But, the producer incentive succeeded beyond anyone's imagination. As a result, the fund established to pay for the credits will be insufficient in future years. As of December 1994, only \$17 million was in the Incentive Fund. Projections by the state's Ethanol Board indicated that the Fund would run out of money within two years and have a shortfall of as much as \$90 million by 2000.

In 1995, the Legislature adopted a method to finance the projected shortfall in the Incentive Fund. The financing would come from two sources: 3/4 of one cent fee per bushel of corn and per hundredweight of grain sorghum and \$8 million for each of the next two years from the state's general fund. Under this formula, growers would pay \$33 million and taxpayers would pay \$42 million.

"Perhaps some day, when the oil is even more precious and the price much higher, than today, the rest of the world, including the court system and the oil industry, will come to realize the ultimate value of a renewable resource such as ethanol. Until then, it's the oil industry 1, farm states 0."

Editorial, *Grand Island Independent*
May 3, 1995

However, the Legislature could alter the funding formula in future years.

The Incentive Fund was unsuccessfully challenged in District Court by a Nebraska taxpayer. The litigant claimed that the Fund violated the state's Constitution by extending the credit of the state to ethanol producers. He subsequently appealed the lower court's decision to the state's Supreme Court. By the end of the reporting period, the Supreme Court had not issued a ruling on the matter.

85 Percent Ethanol: A Regional Alternate Fuel

In September 1994, the state's Department of Roads became one of the few agencies in the nation to participate in a test of heavy-duty engines operating on 95 percent ethanol. The three-year test is being conducted with two trucks that will be used as snow plows and for maintenance in Lincoln and Grand Island.

In October, the Governors' Ethanol Coalition, of which Nebraska is a member, announced plans to use federal, state and private funds to construct forty 85 percent ethanol public fueling stations across the Midwest.

In May 1995, General Motors announced starting with 1997 models, it would manufacture all lightweight trucks to operate on either gasoline or any percentage of ethanol blended fuel, up to 85 percent (After the end of the reporting period, the truck manufacturer said because of unanticipated technical difficulties, the introduction of these trucks would be delayed until model year 1998).

The Future of Ethanol

Ethanol's future as a pollution-fighting fuel additive in reformulated or oxygenated gasoline or as an alternate fuel such as 85 percent ethanol is promising. The fuel's history in the 19th and 20th centuries is illustrative of how governmental and taxing policies can be used to either foster its growth or virtually eliminate its use.

Nebraskans have seen how state taxing policies can encourage its residents to buy ethanol-blended fuels or help investors to build ethanol plants in the state.

Annually, ethanol opponents in Congress attempt to alter national energy policy that fosters ethanol's use. Those attempts cannot be predicted with certainty.

What can be realistically predicted is that, with continued research funding, technological ethanol production breakthroughs will happen. One of the brightest spots appears to be expanding the types of feedstocks available to ethanol producers. While the vast preponderance of the nation's ethanol producers rely on corn and milo as a feedstock, others also use dairy, potato, food and beverage wastes. With the right technology, anything with cellulose can be converted into ethanol.

Some have predicted that because Nebraska has the greatest potential for biomass production in the nation, crop wastes and specially-grown switchgrass could become alternate feedstocks. It is vital that the industry move from reliance on only corn as a feedstock. Even casual observers have seen how Mother Nature can impact corn harvests from year to year. The rising and falling of prices not only affects the grower, but the ethanol producer as well.

In January 1995, the National Renewable Energy Laboratory announced for the first time genetically-altered bacteria used in the production of ethanol had been able to convert two kinds of sugars simultaneously. The impact of this new development is

two-fold: not only could ethanol be produced faster, but the types of feedstocks that could be used expands greatly. The reality of producing ethanol from biomass comes closer and closer. In 1980, it cost \$3.60 to make a gallon of ethanol from biomass. Today, that price is \$1.22. The Laboratory's goal is to reach 60 cents a gallon.

Electricity

State Production and Consumption

In 1994, energy use by the state's electric utilities was 236.3 trillion British thermal units, a decline of 3.3 percent from the 1993 total of 244.3 trillion British thermal units. Nebraskans paid \$1.08 billion for the electricity they used in 1994, an all-time record high.

Electricity produced in the state is produced from coal, nuclear, hydroelectric, natural gas, and petroleum. The first three fuel sources represent the vast majority of electricity resources used in the state. Natural gas and petroleum for the production of electricity are used primarily for smaller peaking units.

Specifically, electrical production in 1994 declined by 800 million kilowatthours from 1993 to 21,947 million kilowatthours, the lowest level of production since 1990. Electricity from coal, at 14,002 million kilowatthours, accounted for 63.8 percent of the production. Nuclear power, at 6,345 million kilowatthours, accounted for 28.9 percent, the lowest level of production since 1985. Electricity from hydropower units, at 1,312 million kilowatthours, accounted for six percent of all power production. A new source of fuel — shredded tires — accounted for just a fraction of one-tenth of one percent, just slightly less than petroleum used for electricity production.

National Trends

The trend of utility deregulation continues to focus on electric power companies. As with the deregulation that occurred in the natural gas industry, the movement to "unbundle" the electric utility system is coming from two directions — the Federal Energy Regulatory Commission at the national level and state-level public utility commissions. "Unbundling" would separate a utility's power production, transmission and local distribution systems.

Initially, deregulation would allow the largest electricity users to directly purchase the electricity they need from any producer and ship it over the lines owned by the utilities.

It is anticipated deregulation will occur first in the areas where electric rates are highest, particular New England and California. The California Public Service Commission which had been forging into deregulation, suddenly slowed as the difficulty of the issues involved became evident.

Electric utilities in the state are watching the deregulation developments very closely. Alliance's utility manager suggested that deregulation could happen within five years in Nebraska. However, the relatively low cost of electricity in the state may forestall significant changes to the traditional utility structure in Nebraska.

Three issues are linked to electric utility deregulation: how to deal with costs such as power plant construction incurred earlier by utilities for which a rate of return has been guaranteed, minimizing rate shifts from one customer group to another such as from industry to residential customers and how rate competition could undermine energy efficiency and renewable energy growth.

State Issues

One of the issues related to deregulation — the rates charged for use of utility transmission lines embroiled two of the states power providers, Nebraska Public Power District and the Municipal Energy Agency of Nebraska. In February 1994, Nebraska

Public Power raised its transmission rates by 23 percent. As a result, the Municipal Energy Agency challenged the fairness of the rates in court and took the issue to the Federal Energy Regulatory Commission. Nebraska Public Power District took the issue to the state's Power Review Board in February 1995. By the end of the reporting period, the issue between the two utilities had not been resolved.

However, one disagreement lasting more than three years, was resolved by Nebraska Public Power District and Central Nebraska Public Power and Irrigation District. The state's largest power producer, Nebraska, and the state's largest river-water irrigator disagreed over money — the amount Central was charging Nebraska for the power produced by Central. With the help of a mediator, the two settled their disagreement in March 1995.

Sale of Western Area Power Administration

In January 1995, the President, in his budget, proposed the sale of Western Area Power Administration as well as several other federal power marketing agencies. The federal agencies produce and sell inexpensive hydropower to publicly-owned electric utilities and state and local governments. Western provides an estimated 10-15 percent of the state's annual electricity needs. According to NMPP Energy, if Western were sold, its power rates could increase from 1.5 cents per kilowatthour to four cents per kilowatthour and result in a \$50 million annual increase in Nebraskans electric bills.

By June 1995, Congress was still considering the sale of Western and other federal power marketing agencies.

Kingsley Dam Relicensing

The eleven-year struggle to obtain a new 30-year renewal of the hydropower dam at Lake McConaughy, north of Ogallala, continued toward resolution.

The Federal Energy Regulatory Commission license to operate the hydropower facility was originally issued

in 1941 and expired in 1987. Since that time, only annual operating licenses have been issued pending the resolution of seemingly conflicting issues — irrigation, power generation, recreation, fish and wildlife welfare, municipal interests and flood control.

In 1992, the Governor proposed the establishment of a flexible “water account” for the benefit of wildlife habitat. The proposal was in response to the federal agency’s initial environmental impact statement.

In March 1994, the Federal Energy Regulatory Commission issued its revised environmental statement including, for the most part, the concept of the flexible “water account.”

In August 1994, the Environmental Protection Agency said the Nebraska plan incorporating the “water account” would result in adverse environmental impacts. Later in 1994, the U.S. Fish and Wildlife Service also found the habitat plan lacking. Several endangered species such as whooping cranes and piping plovers are found on the Platte River in Nebraska.

Any solution is further complicated because the Platte courses through Wyoming and Colorado and actions taken there can have impacts downstream in Nebraska. In mid-1995, governors from the three states agreed to continue discussions on resolving water and environmental issues. The discussions began in 1994.

Many have predicted the Federal Energy Regulatory Commission will reach a final decision on the relicensing of Kingsley Dam in 1996.

Pauline Moore

In October 1993, Nebraska Public Power District approved spending \$57 million to build a second 345 kilovolt transmission line between the Pauline substation south of Hastings and the Moore substation near Crete. The power district planned to have the line operational in 1996.

The utility said the earlier loss of a similar line in a 1993 wind storm pointed to a weakness in the transmission system.

The utility also cited increased transmission sales and elimination of bottlenecks as factors in the decision to build the line.

Opponents of the power line questioned the need and safety of the line. Several lawsuits were filed by property owners on whose land the line would cross.

Two state agencies, the Power Review Board and the Public Service Commission had jurisdiction over aspects of the project. The Power Review Board gave its permission to build the line in 1993. In mid-1994, the Public Service Commission reviewed whether the line would be built safely. In August 1994, the Commission also gave its approval for the utility to build the power line.

A bill was also introduced in the Legislature, but not approved, which would have the effect of delaying construction of the line. The utility was also asked by a group of ratepayers to review the need for the project.

Meanwhile, the process to acquire the land over which the transmission line would pass continued. Actual construction of the power line began in May 1995.

In June 1995, a three-year, \$65 million, definitive federal study of the effects of electromagnetic fields generated by transmission lines and cancer was begun at the Department of Energy’s Oak Ridge National Laboratory.

Other Highlights

- In January 1995, Lincoln Electric System announced its intention to join several non-Nebraska utilities in building a coal-fired electricity plant in northwestern Missouri. The utility said that it could acquire up to 150 megawatts of electricity to meet the utility’s growth projections and to replace the 97 megawatts of power it receives from the Cooper Nuclear Station that is scheduled to close in 2003.
- For the third consecutive summer, wetter and cooler weather than normal caused revenue shortfalls for some of the state’s utilities including Nebraska Public Power District which projected a 1994 revenue shortfall of \$12-\$15 million.
- In late 1994, the two largest electrics in the state, Nebraska and Omaha Public Power District, experienced delayed shipments of coal from Wyoming mines. According to the utilities, coal-fired plants normally maintain a 45-day coal supply, but the supplies had dropped to 15-25 days. Within several months, the coal shortage situation had returned to normal.
- In the aftermath of the state’s utilities’ costliest winter storm in April 1993, the electrical system had been patched together in time for irrigators to turn on the taps in July. In some cases, only temporary repairs were made in the central Nebraska area damaged by the storm. Typical of the devastation to the state’s power system was McCook Public Power District which lost half of its poles and transmission lines. Eight months after the storm, the utility had spent in excess of \$5.5 million for repairs.
- Experiments in new technologies continued at two facilities:
 - For the third year, Nebraska Public Power District’s Sheldon plant near Hallam will burn up to 6,000 tons of shredded tires to supplement its traditional coal fuel. This experiment uses about 600,000 scrap tires, one-third of the scrap tires produced annually in Nebraska.
 - Lincoln Electric System continued its tradition of using experimental technology to squeeze more electricity out of the town’s generators. In a previous experiment, ice was added to increase output at the town’s Rokeby station. In 1994, with the help of the Electric Power Research Institute, the utility added a water injection system to the same plant to increase its capacity by six percent, or 4-5 megawatts of power.
- Spalding Dam, the state’s oldest, continuously operating hydroelectric plant, was getting a much-needed renovation in 1995 courtesy of a nearly \$284,500 grant from the state’s environmental trust fund. The plant began producing electricity in 1919.

- The plant provides 5-7 percent annually of the town's electrical needs.
- Omaha and Nebraska Public Power Districts joined a U.S. Department of Energy effort called Climate Challenge to reduce greenhouse gas emissions coming from coal-fired power plants.
 - Two of the state's top electric officials — Ron Watkins of Nebraska Public Power District and Steve Wacker of NMPP Energy — resigned and retired, respectively.

Nuclear Power and Nuclear Waste

State Production and Consumption

Nuclear generated electricity in the state in 1994 plunged for a second straight year to 67.8 trillion British thermal units, down from 72.7 trillion British thermal units in 1993. This was the lowest amount of electricity generated by nuclear power since 1985 and was primarily attributed to the continued shutdown of Nebraska Public Power District's Cooper station near Brownville. The facility shutdown in May 1993, restarted intermittently, but did not resume full power until late February 1995.

Only 12.1 percent of all energy used in the state in 1994 came from nuclear power, the lowest percentage since 1985 when only nine percent came from nuclear power.

Since the Cooper Station resumed operation in 1995, the amount of electricity generated in the state from nuclear power should increase in 1995.

In comparison, an estimated 18-19 percent of all electricity used in the world in 1994 came from nuclear power, about the same as the previous year.

Nebraskans paid \$44 million in 1994 for the nuclear fuel used to generate electricity used in the state.

National Trends

While the United States has the greatest nuclear capacity in the world, future capacity is expected to increase only three percent in the next decade. By 2010, America's nuclear capacity will decline from 99 gigawatts to about 93 gigawatts as older units are deactivated. A gigawatt is one million kilowatts.

The nuclear power industry has stalled in America because of three factors: high operating and construction costs relative to other fuel sources and unsolved nuclear waste disposal.

State Trends

No new nuclear facilities are planned for construction by utilities in the state due to cost inefficiencies and unsolved storage issues for low and high level waste.

Nebraska Nuclear Facilities

The state has two nuclear power generating facilities — Fort Calhoun Nuclear Station operated by Omaha Public Power District and Cooper Nuclear Station near Brownville operated by Nebraska Public Power District. Fort Calhoun and Cooper are two of the older commercial nuclear facilities still operating in the nation.

A routine outage in 1993 developed into a prolonged outage and management

shakeup at Nebraska Public Power District's Cooper Station. When operating, Cooper produces about one-third of the utility's electrical generation and up to one-third of Lincoln's electrical supply.

Starting in 1993, the Nuclear Regulatory Commission expressed continued concern about the plants operation and levied fines totaling \$400,000 against Nebraska Public Power District. The plant's troubles continued into 1994 when a malfunctioning valve caused a prolonged outage starting in May 1994.

One result of the unanticipated outage was increased rates for some Nebraskans who relied on power from the plant. In September 1995, Loup Public Power, based in Columbus, announced residential customers would pay an increase of about one dollar a month to cover the higher costs of power production. The main recipient of power from the plant, Midwest Power in Iowa, reported in May 1995 it had spent an additional \$15 million for replacement electricity. Lincoln Electric System indicated it had spent an extra \$8 million for replacement electricity.

In December 1995, the Nuclear Regulatory Commission levied a new fine of \$300,000 against the utility. The utility said in February the outage had cost \$15 million — \$8 million for replacement power and \$7 million for new staffing needs at the station. The utility also shifted its nuclear power employees from Columbus to the site of the plant in Brownville.

The plant restarted February 9, 1995 after being shutdown for more than eight months. Shutting down only briefly — a common problem after lengthy outages — the plant regained 100 percent generating capacity by the end of February. In June 1995, the previously troubled plant was removed from the Nuclear Regulatory Commission's list of downward trending nuclear plants. Cooper was placed on the list in January 1994.

“Do we want people who run nuclear power plants to sneer at the regulators who are hired to make sure they run safely? As much as we dislike government regulation, most of us would agree this is one area where we'd like to have the regulators err on the side of strictness rather than leniency.

“NPPD officials say the company's mind-set has changed...

“Most of us do not run nuclear power plants. But as buyers of NPPD's electric power, we all paid something for the lesson it learned the hard way at Cooper Nuclear.”

Editorial, *North Platte Telegraph*
February 17, 1995

Nuclear Waste

The majority of nuclear waste in the state is produced by the two nuclear power stations. For storage purposes, radioactive material is classified as high or low level waste depending on the length of time the waste remains radioactive.

High level waste is spent nuclear fuel and has primarily been stored on site at the nuclear power plants awaiting construction of a temporary or permanent repository. Fort Calhoun has storage capacity until 2007. The Cooper station expects to exhaust on-site storage by 2002.

Permanent High Level Waste

The *Nuclear Waste Policy Act*, passed by Congress in 1982, set forth the storage options for the radioactive waste:

- Defense Department radioactive waste would generally be segregated from commercial radioactive waste and stored at the Waste Isolation Pilot Plant.
- A permanent storage facility would become the final repository for spent nuclear fuel from commercial reactors. By 1998, the U.S. Department of Energy was supposed to start picking up the waste from nuclear reactors and move it to the permanent site. In 1987, Congress selected Yucca Mountain, Nevada, as the most likely site — if found suitable — for spent nuclear fuel from the nation's 109 reactors.
- If needed, a temporary radioactive waste storage facility, called monitored retrievable storage, would be located at an undetermined site.

To finance the Yucca Mountain site, utilities with nuclear generators have been paying one-tenth of a cent per kilowatt-hour produced by the reactors. As of mid-1995, nearly \$140 million has been paid by Nebraskans into the nuclear waste fund.

Waste Isolation Pilot Plant

The furthest developed facility, the Waste Isolation Pilot Plant, was begun in 1983 near Carlsbad, New Mexico. Designed to store radioactive wastes

resulting from the production of nuclear weapons, it is also a test of the use of prehistoric salt beds to entomb the wastes. These wastes will remain deadly for 240,000 years.

The \$1 billion storage plant has been plagued by technical, legal and political problems and may never become fully operational. This storage option remains questionable despite its \$14 million a month costs.

Yucca Mountain

Since the selection of Yucca Mountain, the federal energy agency has faced both technical problems and local opposition. While site testing continues, the revised operational date of 2010 may again be postponed. An estimated \$1.8 billion have been spent to date evaluating the proposed site. In March 1995, some of the scientific squabbles around the project became public as some researchers suggested that by concentrating the waste at one site, the possibility of an atomic explosion increased. Other researchers disagreed.

In 1995, legislation was introduced in the Senate to make the selection of Yucca Mountain permanent. In the House, two budget chairmen proposed abandoning Yucca Mountain and beginning anew the search for both temporary and permanent storage, albeit with dramatically reduced funding. Under their proposal, a temporary facility would be built to store the spent fuel for only 100 years, not 10,000 as proposed in the permanent facility. The likeliest sites for the temporary storage are Yucca Mountain, Hanford, Washington and Savannah River, South Carolina. By the end of the reporting period, Congressional action on the proposals was still pending.

In July 1994, the U.S. Department of Energy was challenged in two separate lawsuits to provide a storage site by 1998, the original operational date for permanent storage. Fourteen investor utilities filed one lawsuit, and 27 public agencies filed the second legal action. Nebraska joined the public agency lawsuit on behalf of the state's ratepayers who had contributed to the construction fund for the storage facility. The lawsuits are currently pending in federal courts in the District of Columbia.

Monitored Retrievable Storage

Temporary storage of spent nuclear fuel was also listed as a possibility in the 1982 law if a permanent facility was not operational by 1998.

According to the Edison Electric Institute, an estimated 35 nuclear plants will exhaust their on-site storage of radioactive waste by 2007, including the two plants in Nebraska.

Action during the reporting period on this type of storage focused on not one, but three storage options: a government-operated facility, a private one operated by utilities and actions being taken individually by utilities that have exhausted on-site storage options.

Two Native American tribes, the Mescalero Apaches in New Mexico and the Skull Valley Band of Goshutes in Utah have shown the most interest in developing temporary storage of nuclear wastes that is government-operated. According to the nation's nuclear waste negotiator, assessments of two possible sites at the Goshute reservation are being conducted. The Mescalero Apaches have shown greater interest in developing a private storage facility.

According to the Nuclear Regulatory Commission, five currently operating nuclear plants are storing waste outside the plant in temporary, concrete facilities and applications for similar storage units are pending from six more plants.

A Private Storage Facility

In 1994, Omaha and Nebraska Public Power Districts joined with 31 other utilities exploring the possibility of constructing a privately-operated temporary storage facility on Mescalero Apache tribal land in New Mexico. In December 1994, the tribal leaders signed a nonbinding agreement with the utilities. In two successive votes in early 1995, the tribe first rejected, then agreed to the concept of a temporary storage facility. The tribe estimated revenues at \$250 million for storing the waste for 40 years. In mid-1995,

the Nebraska utilities decided to leave the group of utilities pursuing the Mescalero Apache project.

Transporting Nuclear Waste

Whether high level waste is civilian or military, it must be moved from where it was produced to temporary or permanent storage sites. Because many nuclear facilities are east of Nebraska and likely storage areas are west of the state, rail lines and highways in Nebraska are probable corridors for shipments of radioactive waste. One nuclear group estimated that 15,000 truck or rail shipments would be needed over the next 30 years to move the waste from generators to storage sites. As many as 12,000 of those shipments could pass through Nebraska. According to the Nebraska State Patrol, currently only one or two shipments a month passes through the state. In 1995, the Legislature debated a bill to increase the liability of high level nuclear waste transporters. Legislative action was still pending at the end of the reporting period.

Permanent Low Level Waste Storage

Nebraska belongs to one of nine regional or state compacts in the nation formed to develop storage facilities for low level radioactive waste. Low level waste is generally composed of clothing, filters, resins, tools and other items from nuclear power plants and hospitals. According to the U.S. Department of Energy, utilities generate more than 50 percent of the low level waste. In Nebraska, it is estimated that utilities generate 90 percent of the low level waste. Low level waste remains radioactive for 90 days to 200 years, according to experts.

Boyd County Radioactive Waste Storage Facility and Related Issues

Since Boyd County, Nebraska, was selected in 1988 by its regional compact, the Central Interstate Low Level Radioactive Waste Commission, and the developer, U.S. Ecology, the building of a low level radioactive waste facility has progressed along a predetermined number of stages. The facility is now estimated to cost \$146.5 million, more than four times the original estimate of \$35 million. The facility, if built, is expected to be operational in 1999. As of January 1995, \$65 million had been spent on siting and licensing issues.

Until a regional facility is operational, the two utilities had been storing waste on site or sending the waste to a facility in South Carolina. The Southeast Regional Compact, which operates the South Carolina facility, agreed to let the five states in the Interstate Compact continue to use the South Carolina facility until June 1994. Within several months after closure to non-Southeast Regional members in 1994, the Governor of South Carolina offered to reopen the facility to the entire nation. If the facility were reopened, South Carolina estimated it would receive more than \$100 million annually in fees. In June 1995, the South Carolina legislature voted to reopen the Barnwell landfill to all low level radioactive waste generators.

In August 1995, the federal Corps of Engineers found a small wetlands area within the new, downsized 110 acre Boyd County site. Earlier, the contractor had downsized the site because a larger wetlands area was contained in the originally designed storage area.

In November, the U.S. Supreme Court upheld earlier federal court decisions on whether local residents in Boyd County had, in fact, given community consent to build a low level radioactive waste storage site. The courts said the state had waited too long before filing the lawsuit.

The state's Department of Environmental Quality has indicated that its final review of the application to build a site in Boyd County should be completed by February or March 1996. It is likely after public hearings, the state could not issue a license decision before late 1996 or 1997.

Other Highlights

- Nineteen-ninety-four brought the 25th anniversary of the entombing of the state's first nuclear power reactor. The experimental plant, the world's first liquid sodium-

graphite reactor, was located southwest of Lincoln near Hallam. The plant began operation in 1964 and was shutdown after 14 months of operation when the liquid sodium leaked through cracks in the reactor. Decommissioned in 1969 by the Atomic Energy Commission, the radioactive sodium was transported to storage areas outside Nebraska. However, the plant itself was encased in six feet of concrete and remains buried today. According to the state's Department of Health, the plant will remain radioactive for a thousand years. Monitoring of ground water near the plant is conducted twice yearly by the state under contract to the Nuclear Regulatory Commission.

Natural Gas

State Production and Consumption

After peaking in 1973 at more than 230 trillion British thermal units, Nebraska's natural gas consumption has plummeted by nearly half to 123.8 trillion British thermal units in 1994. Natural gas use in the state was largely unchanged from 1993.

Natural gas expenditures in the state totaled more than \$500 million in 1994, still below the peak of \$567 million in 1984, and a decline of 2.3 percent from 1993.

While a small amount of natural gas is mined in the state — less than 2.5 percent of that is used in a year — a production surge that began in 1993 continued into 1994. Natural gas production increased by 38 percent in 1994 to 2.9 billion cubic feet from 2.1 billion cubic feet in 1993.

The all-time state production low was reached in 1991 at 784 million cubic feet. In the past three years, production has quadrupled and the number of wells has increased nearly sevenfold to a record high of more than 70. All of the state's production is confined to five counties in the Panhandle as shown in figure 14. Cheyenne county by itself accounted for all but 17 percent of the state's natural gas

production in 1994. The value of the natural gas produced in 1994 was estimated at \$4.64 million based on 1994 wellhead prices of \$1.60 for a thousand cubic feet.

National Trends

Two natural gas trends, reported in previous *Annual Reports*, continued: the spreading impacts of industry deregulation as a result of Federal Energy Regulatory Commission Order 636 and consolidation of the industry at all levels.

Order 636 fundamentally changed the natural gas utility industry. Securing supplies of natural gas became the responsibility of local utilities, with pipelines reverting to a common carrier status. The effect of the "unbundling" of services forced utilities to deal with every leg of the fuel's travel, from well-head to the customer's door. In the past, utilities relied on a regulated system to guarantee an adequate supply for their customers. With the regulatory safety nets stripped away, utilities must purchase the right amount of gas for the right customers. The new system will also cause a shift in costs according to the *Wall Street Journal*. Individual homeowners and small businesses will likely pay more, while big industrial customers will be able to negotiate for lower costs.

A third trend paralleling the nation's oil dependency began to emerge in 1994: the slow, but steady, rise in natural gas imports, primarily from Canada. These imports accounted for only ten percent of America's total energy consumption in 1992. By 1994, imports of natural gas from Canada increased by nearly 25 percent to 12.4 percent. The Energy Information Administration and others project these imports to rise to 15 percent by 2000.

Additional pipelines bringing cheaper Canadian gas to the United States, could cause a collapse in the

domestic natural gas industry just like cheap imported oil has decimated the domestic oil industry.

State Trends

The ramifications of Federal Energy Regulatory Commission's Order 636 continued to resonate throughout the state, primarily for larger natural gas users.

The state's largest users of natural gas have always been able to secure the gas they need from sources other than the local provider.

But now, customer groups such as motel or restaurant associations and even schools are finding that by using a third party to secure natural gas supplies, they can save from five to 17 percent on their natural gas bills. For the first time, these smaller commercial operations are reaping the benefits that previously only larger firms could realize.

Even a number of smaller cities — Auburn, Fairbury and Wahoo — have, in essence, become a "customer group" capable of supplying natural gas to the larger users in their jurisdiction.

Under these arrangements, the previous natural gas supplier, the local distribution company, serves as a common carrier.

Other Highlights

Kearney joined just a handful of cities in the nation — and unique in Nebraska — to have two competing investor-owned natural gas companies: Northwest Public Service and KN Energy. This is one of the more unusual developments resulting from Order 636. This intercity competition by the natural gas rivals is primarily limited to larger natural gas customers.

Hastings briefly considered becoming the state's second city with competing natural gas utilities, but the city council rejected KN Energy's request for a franchise to compete against the municipally-owned natural gas system.

Petroleum

State Production and Consumption

Oil production in the state plummeted again by 13.9 percent in 1994 to a new modern-day low of 4.22 million barrels. Based on a 1994 price of \$13.60 per barrel, the value of the state's oil production was \$57.4 million.

The last time oil production was this low, 1952, the state's first oil well was just a teenager. Only 1,800 barrels were pumped in 1939, the year of the first oil strike in the state. By 1952, production had risen to 2.68 million barrels. None of the oil mined in the state is refined in Nebraska.

It appears even the use of advanced oil recovery technology, where practical, will not reverse the state's oil production decline.

One of the consequences of the continued decline in oil production may be a funding shortfall for the state's Oil and Gas Conservation Commission.

An estimated 39.2 million barrels of oil were consumed in the state in 1994, less

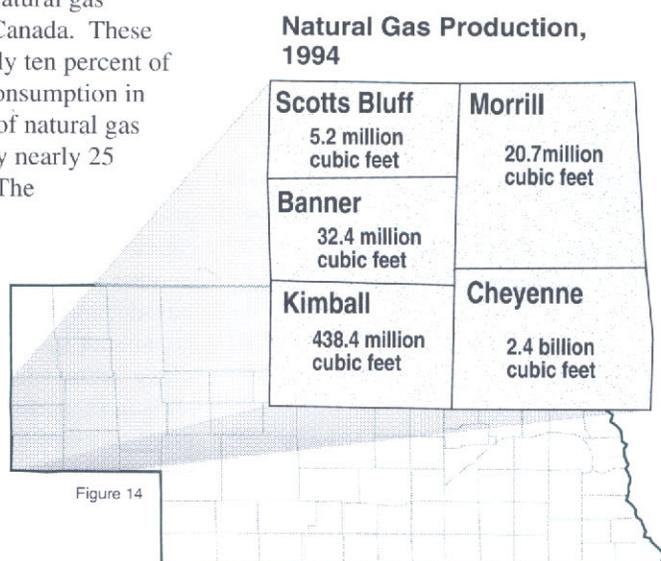
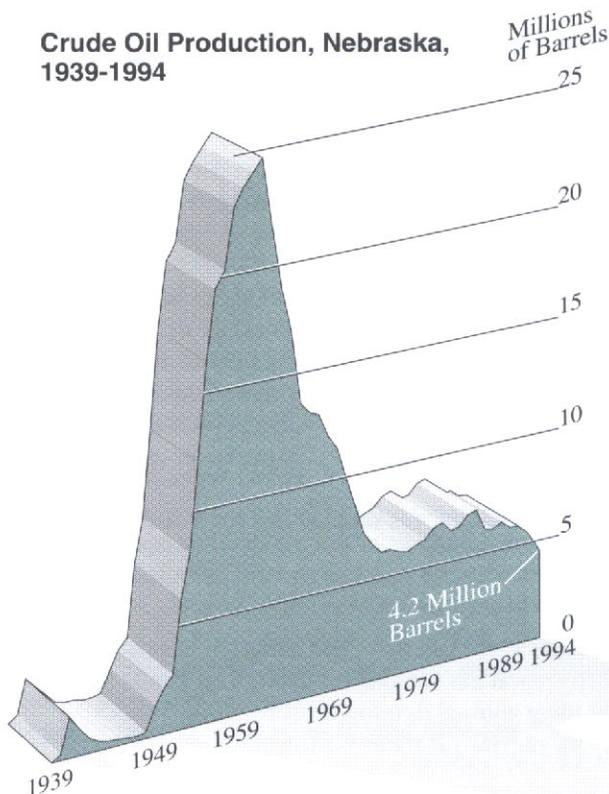


Figure 14

Source: Nebraska Oil Activity Summary. Nebraska Oil and Gas Conservation Commission. Sidney, Nebraska. Annual

Crude Oil Production, Nebraska, 1939-1994



Source: Nebraska Oil and Gas Conservation Commission

Figure 15

The Interstate Oil and Gas Compact Commission, which Nebraska's Governor Nelson will head in 1996, released a production report on output from stripper wells. Stripper wells produce fewer than ten barrels of oil a day. Nineteen percent of all operating wells in the U.S. in 1993 were stripper wells.

In 1993, output from stripper wells fell to a 20-year low, providing only 975,000 barrels of oil a day. In Nebraska, approximately 80 percent of the producing wells are stripper wells.

The Petroleum Institute released a trends report in fall 1994 indicating America's oil import situation will only deteriorate over time. The Institute predicted oil imports would rise between eight and nine percent annually, oil consumption would gradually increase and domestic production would decline not-so-gradually.

Looking at world-wide energy needs, a writer in the *Wall Street Journal* predicted oil use would likely grow two percent annually over the next several years — that is 1.25 million barrels of oil a day — from daily consumption of 68 million barrels of oil in 1994. By 2000, it is estimated world consumption will equal 76 million barrels a day. Industry analysts have suggested while Middle Eastern output could meet growth needs in the near term, the countries don't have sufficient capital for making the necessary infrastructure improvements needed to further boost oil production after the start of the millennium.

Several emerging trends appear to temper some of the more pessimistic projections:

- A six-year decline in production from non-Organization of Petroleum Exporting Countries was reversed in 1994. Experts attributed this turnaround to the increased use of new technology and successful exploration in foreign countries. Experts have projected that oil production from these countries will increase by 6.5 percent by 2000.

than 11 percent — down from about 14 percent in 1993 — of that was produced in the state. As a result, more and more of the state's petroleum needs are being met by other states and countries.

National Trends

The state's oil dependence is increasingly being paralleled by the nation as a whole. According to the American Petroleum Institute, oil imports into the United States set an all-time record of 50.4 percent of domestic demand, climbing by 3.4 percent from 1993. The cost of imported oil in 1994 was estimated at \$45 billion. Oil production in the nation again declined to a 40-year low of 6.6 million barrels per day, the lowest annual level since 1954.

- American independent oil producers, buying vast, older oil fields from big oil companies have been able to dramatically increase production. As a result, exploration and development rose significantly in 1994 for the first time since 1990.
- The success of very deep sea oil wells in the Gulf of Mexico have given rise to the possibility that an oil well field containing an estimated 15 billion barrels of oil — 50 percent larger than famed Prudhoe Bay in Alaska — could be productive using the latest technologies including deep diving robots and immense oil drilling platforms. Two additional drilling platforms, at depths of more than 3,000 feet, are expected to become operational in 1996 and 1998. If original estimates prove accurate this new field could lessen the nation's dependence on imports.

According to some in the petroleum industry, a period of increased price instability may be likely in the near future. However, in spite of slow, but steady, price rises in oil prices in 1994, crude oil prices, after accounting for inflation, were one-third below 1983 prices.

The biggest change in the nation's transportation fueling system since the removal of lead in 1974, began in January 1995 with the introduction of reformulated gasoline. Use of reformulated gasoline is required in the nation's nine smoggiest cities and accounts for about one-third of all gasoline sold. The new gasoline is designed to evaporate less readily, burn more thoroughly and contain fewer toxic compounds. According to estimates from the Environmental Protection Agency, the price of this new gasoline will be about four to six cents higher than gasoline used in other parts of the nation. However, the introduction of the new gasoline did not go without some problems. Several areas of the nation which had requested to voluntarily participate in selling the gasoline asked to be removed, in part, because the initial price difference was considerably higher in some areas than expected.

State Trends

Two issues that affected Nebraskans in 1993-1994 surfaced again in 1994-1995: fuel taxes and gasoline price increases.

Nebraska moved from seventh highest in the nation to fifth highest on state gasoline taxes during the period. As of July 1995, the state tax per gallon of gasoline was 25.7 cents. In Nebraska, unlike most other states, fuel taxes are the only state revenues used to build and repair state roads.

Beginning in August 1994, motorists across the state found gasoline prices rising by ten to 15 cents a gallon within a thirty day period. But the rise in prices was short-lived when they fell by an equal amount the following month.

Other Highlights

- In 1995, Congress approved the export of oil from Alaska to foreign countries. A prohibition on the sale of oil from Prudhoe Bay had been in effect for 25 years. The U.S. Department of Energy estimates that Alaskan oil supplies about 25 percent of the nation's petroleum needs.
- An enormous oil spill from a Russian pipeline in the summer of 1994 damaged an estimated 170 acres of land. The amount of oil spilled was estimated to be between three and eight times the amount spilled in Prince William Sound by the Exxon Valdez.
- The state's long-time director of the Nebraska Oil and Gas Conservation Commission, Paul Roberts, retired in 1994. He became the Commission's director in 1967. The Commission was first created in 1959, ten years after oil production began in western Nebraska.

Alternate Energy

Efforts to develop clean, abundant and affordable alternates to the use of fossil fuels have been aided by five factors — technological improvements, increasingly stringent environmental laws, federal research funding, utility regulators and

“...the United States has defined the sovereignty of Kuwait as in our national interest.

“Why is a weak little monarchy half a world away so crucial?

“Oil.

“The majority of our imported oil comes from the Persian Gulf.

“And there's no real sign that as a country we think this is a problem. Our gas prices are the lowest in the Western world, our lifestyle dependent on a fix of oil to grease the machinery that makes the engines of our economy whirl.

“We just don't get it. We didn't get it after the bully OPEC countries hiked the price of oil in 1973 and again in 1979. We didn't get it after Saddam marched into Kuwait in 1991 and U.S. troops had to march him back out.

...there's still no sign that we think our oil habit is dangerous.”

Editorial, *Lincoln Star*
October 18, 1994

broad-based public support. Because Nebraska is a public power state, utility regulators are not considered a factor in fostering the growth of alternate energy forms in the state. The impact of possible environmental law retrenchment or federal research budget cuts on alternate energy by Congress is unknown at this time.

The five main alternate energy sources — biomass, geothermal, hydropower, solar and wind — are detailed in this section.

State Production and Consumption

In 1994, hydropower supplied an estimated two percent of the total energy consumed in Nebraska. Biomass, in the form of ethanol, supplied 0.7-0.8 percent in 1994. The Energy Office estimated in 1994, all five forms of alternate energy supplied approximately three percent of the energy used. While energy production from alternate energy sources is increasing, the increases, with the exception of ethanol which doubled in the past year, are generally small.

National Trends

According to the U.S. Department of Energy in its *Renewable Energy Annual*, seven percent of the nation's total energy needs were met by renewable energy resources. Nearly half of the seven percent came from hydroelectric, followed by biomass (45 percent), geothermal (six percent) and solar and wind (one percent each). The *Report* noted among non-utility generators of electricity, renewables account for 25 percent of the electricity generated. The *Report* found wind energy grew the fastest over the past 15 years due to the decline in production costs from 50 cents per kilowatthour in 1980 to five to seven cents per kilowatthour today. The *Report* also found the future of renewables in electricity production was uncertain, due in great part to competition and deregulation of the electric utility industry.

A national poll was conducted on support for federal research of renewable technologies by the Alliance to Save Energy at the end of 1994. The poll found nearly two-thirds of the respondents wanted federal energy research dollars spent on either renewable or energy efficiency technologies. Research funding for fossil and other fuels — natural gas, nuclear and oil was supported by only 15, 9 and 7 percent, respectively.

Previous renewable technology research conducted by the federal government, particularly the U.S. Department of Energy and the Electric Power Research Institute, have increased the possibility of farmers becoming energy producers. The two groups predicted by 2010, energy crops could generate enough electricity to meet the residential needs of 20 cities each the size of San Francisco.

State Trends

In 1982, a number of Nebraskans participated in setting goals in key areas, including energy, for the year 2000 under the Nebraska 2000 Task Force.

“Nebraska should become a leading state in developing use of alternate forms of energy. This goal should be achieved by setting good examples in state facilities and by providing tax incentives for industry and homeowners.”

Energy Section
Final Report Summary
Nebraska 2000 Task Force

In reviewing the state's progress in reaching this goal, the editor of the *North Platte Telegraph* gave the state a passing grade because Nebraska has become a leader in producing grain-based fuel and is examining the potential for wind generated electricity.

However, several electric utilities surveyed their customers regarding their attitudes toward electricity produced from renewable resources and their willingness to pay possibly higher utility bills. An unscientific survey by Norris Public Power District, a rural electric serving parts of five counties in southeast Nebraska, found two-thirds of the nearly 2,100 respondents would not be willing to pay more for electricity generated from renewable resources. About 16 percent of the utility's customers participated in the survey.

Several legislative bills seeking to advance different types of alternate energy — from wind to biomass — were offered for consideration during the 1995 session of the Unicameral. None of the bills were passed by the senators. One supporter who testified at the hearing, a California utility board member, said Nebraska could easily meet its own energy needs and even export significant amounts of electricity. He based his conclusion on previous wind, biomass, ethanol and other renewable energy studies conducted in the state.

Fuel Source Types

Biomass

While most of the emphasis on biomass energy sources continues to focus on fuels of the future — switchgrass, genetically-engineered trees, garbage and crop wastes — the reality is, in Nebraska, wood remains the primary alternate biomass fuel in use today, followed by corn used for ethanol production.

A one-day, nationally-televized conference on the promise and progress of biomass-to-electricity technology was held in Nebraska City in late June 1994. A federal energy research expert predicted in the next five years, transitional technologies such as co-firing electric plants with coal and biomass resources are most likely. This approach would take advantage of current equipment while resolving common biomass problems such as storage and transportation. Additionally, not all biomass resources are compatible with current steam boiler technology. Certain types of woods such as oak and pine cause few problems while straws and switchgrasses have caused considerable problems.

Several Nebraska groups are attempting to have the state's utilities generate up to 25 percent of their electricity from biomass sources by 2010.

Geothermal

Geothermal energy use in Nebraska remains limited to small-scale systems such as ground-source heat pumps used in schools, businesses and homes.

Hydropower

Hydropower in the state comes from two sources — 11 hydroelectric dams in or on the border of the state and power supplied to Nebraska by Western Area Power Administration. The power administration transfers hydroelectric power produced in western states to state agencies, municipalities and public power districts. Taken together, all hydroelectric sources met more than 14 percent of the state's electricity

needs in 1994. Nationally, about 8.4 percent of the country's electricity needs are met through hydropower annually.

At this time, it is not anticipated other sources having hydroelectric potential will be developed in the state. It is more likely hydro resources will decline with time. For example, the resolution of the relicensing of Kingsley Dam may result in a reduction in the production of electricity.

Solar

Solar or photovoltaic energy continued to make significant technological gains in 1994-1995, reducing yet again the cost of electricity from this power source.

Financed by the Electric Power Research Institute, a brand new type of solar technology nearly doubled, to 20 percent, the efficiency of older types of solar cells. A prototype capable of generating 20 kilowatts of electricity (enough for a cluster of homes) was expected to be completed by the end of 1994 by Arizona Public Service.

An alternative technology was proposed for testing in the Nevada desert by the nation's largest natural gas company, Enron, in late 1994. The proposal called for building a 100 megawatt, \$150 million facility (similar in output to NPPD's Canaday plant near Lexington or Grand Island's Platte facility) in 10 megawatt increments over ten years. The installation would become the world's largest, capable of meeting the electrical needs of 20,000 homes.

A third test currently underway has implications for Nebraska. The Environmental Protection Agency is working with ten utilities across the nation to install 18 kilowatt solar arrays for evaluation. The tests have several goals: measure the value of the cells in northern climates and clock the output hour by hour for a year comparing the output to the cost of electricity from other sources at any given time. Peak generation, peak prices and peak sunlight generally occur at the same time — on hot, summer afternoons. That's certainly the case in Nebraska. Relying on solar cells instead of expensive peaking power units may be the key to

solar cells wide spread use by utilities.

The key to advancing solar technology remains moving from a one-of-a-kind prototype to mass production. When solar cells are mass produced, the cost of production plummets. For example, if the technology used in the Arizona test could be mass produced, it has been estimated electricity from the solar cells could be produced for 5.5 to 6 cents per kilowatt, including one cent for maintenance. However, this is still above current Nebraska electricity production costs, but well below the national average price of eight cents per kilowatt.

Current, cost-effective use of solar cell technology in Nebraska is primarily limited to the powering of electric fences by cattle producers.

One of the state's rural electric systems, Wheatbelt in Sidney, is currently testing a solar-powered pump for livestock wells. Remote, sparsely settled areas are where solar power can be cost-effective in today's America. These types of solar units would be far cheaper than rural electrics current alternative — constructing a new power line for \$18,000 per mile, plus operation and maintenance costs.

Wind

The two wind studies announced in 1993-1994 got underway during this reporting period.

Earlier studies by the Union of Concerned Scientists had estimated wind

resources in the state were sufficient to supply 120 times the amount of electricity currently being used in Nebraska — the equivalent of seven percent of the electricity used in the nation.

The first study is being conducted near Ainsworth by Nebraska Public Power District, KBR Rural Public Power District and Battelle Pacific Northwest Laboratory, part of the U.S. Department of Energy.

One of five studies in the nation, Ainsworth was selected because earlier studies found the area to have good potential for wind generation in the summer, when the state's electricity need is greatest and the site is also located close to an existing transmission system — both important factors. The study should conclude in 1995 or 1996 and the findings will be available to all utilities in the state.

“Obviously, any final decisions to go ahead with actual construction will be based largely on cost-efficiency considerations. But given the facts that the Nebraska Public Power District is having ongoing problems at its nuclear generation site, and that the wind blows forever while coal and oil are not renewable resources, such a study is certainly warranted at this time.”

Editorial, *Grand Island Independent*
December 29, 1994

“Could it be that some day the Fort Calhoun Nuclear Power Station will be replaced by thousands of wind generators all over Nebraska? If wind power holds any potential for Nebraska, it would be nice to know that before the next generation of power plant construction begins.”

Editorial, *Blair Pilot-Tribune*
August 9, 1994

The second, and larger, study is being undertaken by the Nebraska Power Association and the Energy Office. The \$300,000, three year study first concentrated on narrowing the initial 20 sites in Boyd, Brown, Burt, Butler, Cedar, Chase, Cheyenne, Dakota, Dundy, Garden, Holt, Kimball, Keya Paha, Morrill, Rock, Saunders, Seward, Sheridan, Thurston and Washington down to just eight. Once a contractor was selected, the initial sites selected were near

Imperial, Kimball, Rushville, Springview, Stuart, Valentine, Wahoo and Winnebago. The results from the first two months of monitoring appears in figure 16.

Imperial, Kimball, Rushville, Springview, Stuart, Valentine, Wahoo and Winnebago. The results from the first two months of monitoring appears in figure 16.

One cautionary example of the barriers to using wind to generate electricity surfaced at a legislative hearing in the fall of 1994. A California company told a Scottsbluff landowner who had been monitoring wind speeds on his farm for a year if he could find a buyer for up to 70 megawatts of electricity at 4.5 cents per kilowatt-hour, the company

would build a \$75 million wind farm. Two power providers the landowner contacted would only pay one cent per kilowatt-hour, the avoided cost of running the utility's own power plants. Under federal law, utilities buying power from non-utility providers do not have to pay more than avoided costs.

Average Annual Wind Speed in Nebraska, in Miles-per-Hour

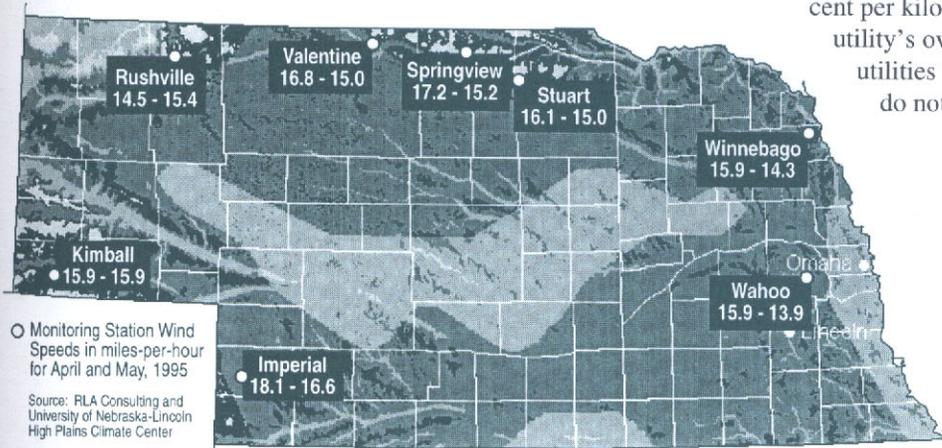


Figure 16

Fiscal and Organizational Notes

Financial Review

The accompanying figures illustrate the Energy Office's income and expenses from July 1, 1994, through June 30, 1995, which amounted to \$12,808,861 and includes federal funds, state funds and oil overcharge funds.

Approximately 53 percent of the agency's funding came from oil overcharge funds, a four percent increase from the previous year.

Oil overcharge funds and state severance tax funds increased by nearly 21 percent and about 23.5 percent respectively. The appearance of an increase in both types of funds was, in fact, increased activity — loans being made and repaid.

State funds came exclusively from severance taxes. No state general funds have been appropriated to the Energy Office since 1983.

Half of all expenditures were used for oil overcharge aid and contracted projects listed in the Oil Overcharge Funds section starting on page 2. More than 79 percent of all federal funds were expended as aid in the Low-Income Weatherization

Where The Money Came From, 1988-1995

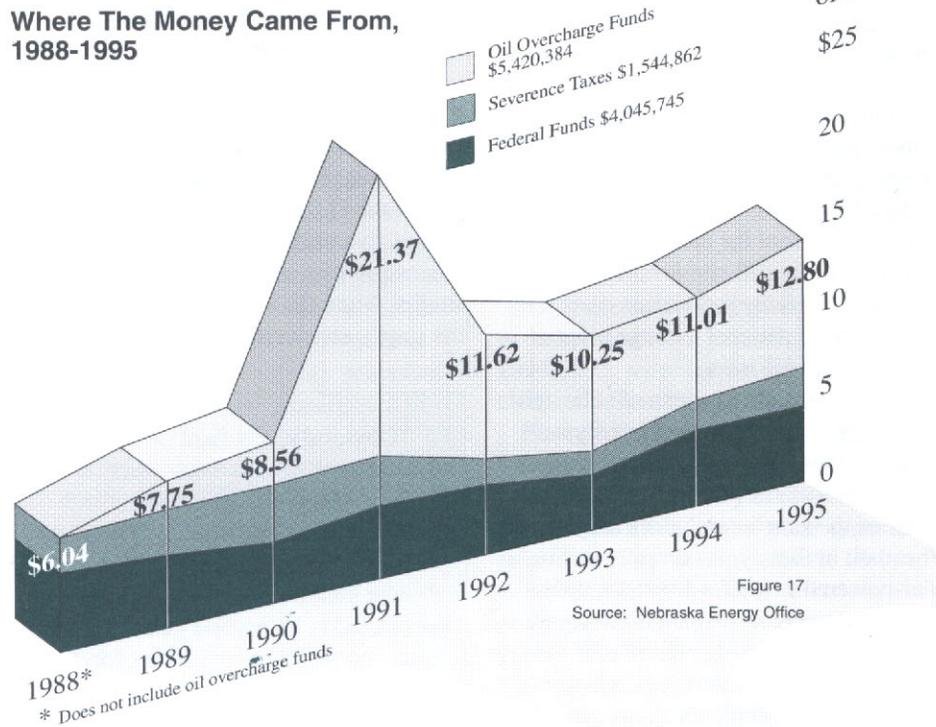


Figure 17
Source: Nebraska Energy Office

Where The Money Went, 1988-1995

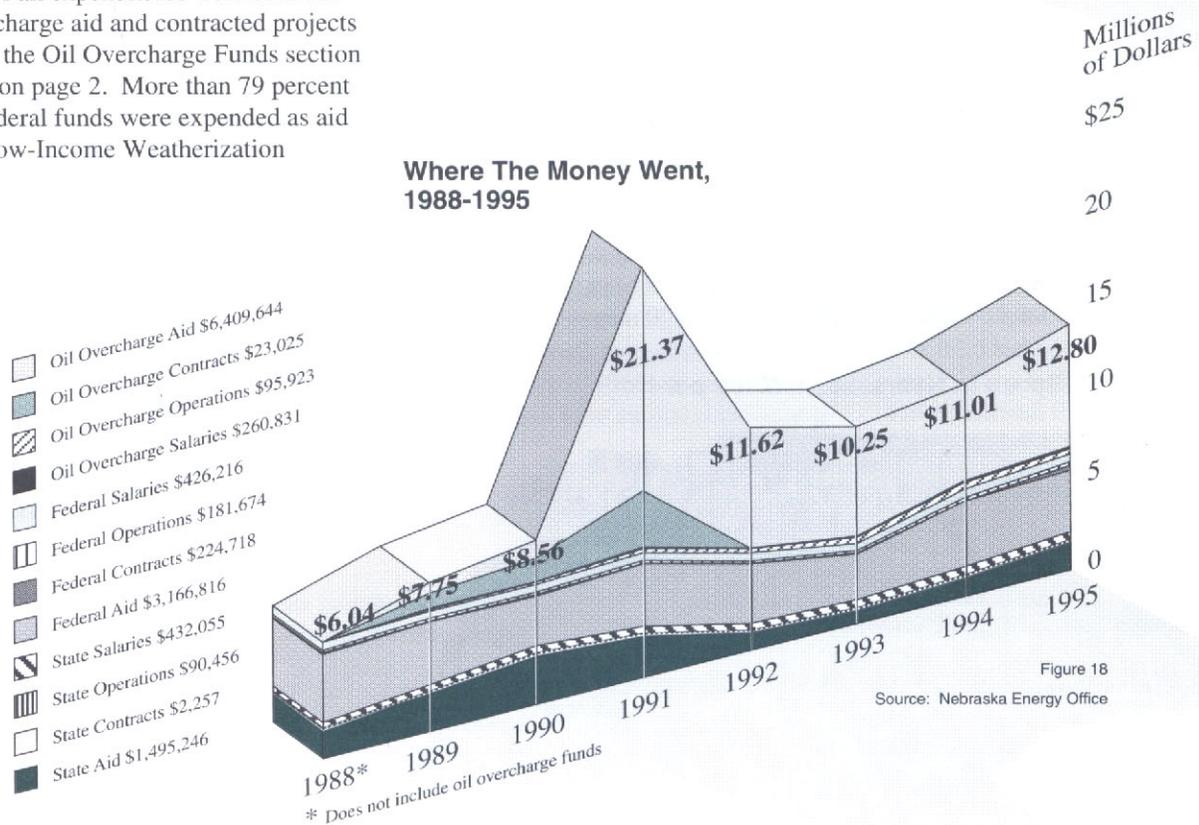


Figure 18
Source: Nebraska Energy Office

Assistance Program. In excess of 74 percent of all state severance taxes were spent as aid under the School District Energy Efficiency Program.

A full accounting of the Energy Office funds appears in figures 17 and 18.

Overall, the agency spent state, federal and oil overcharge funds in eight different ways. Aid, which makes up the largest portion of the agency's expenditures, consists of money from the three sources which is received and passed on to delegate agencies or directly to

beneficiaries such as schools, hospitals, small businesses, local governments and individuals. Money spent for operations pays travel, telephone, computers, salaries and other office expenses.

A more detailed accounting of the oil overcharge funds appears on pages 2 and 3.

Organization

The Energy Office was created in November 1973 as the Fuel Allocations Office, a division of the Nebraska Department of Revenue. The agency had independent status from 1977 to January 1987, when it became by Executive Order of the Governor, a division of the Governor's Policy Research Office.

The organizational chart below shows the functional structure of the Energy Office during the reporting period.

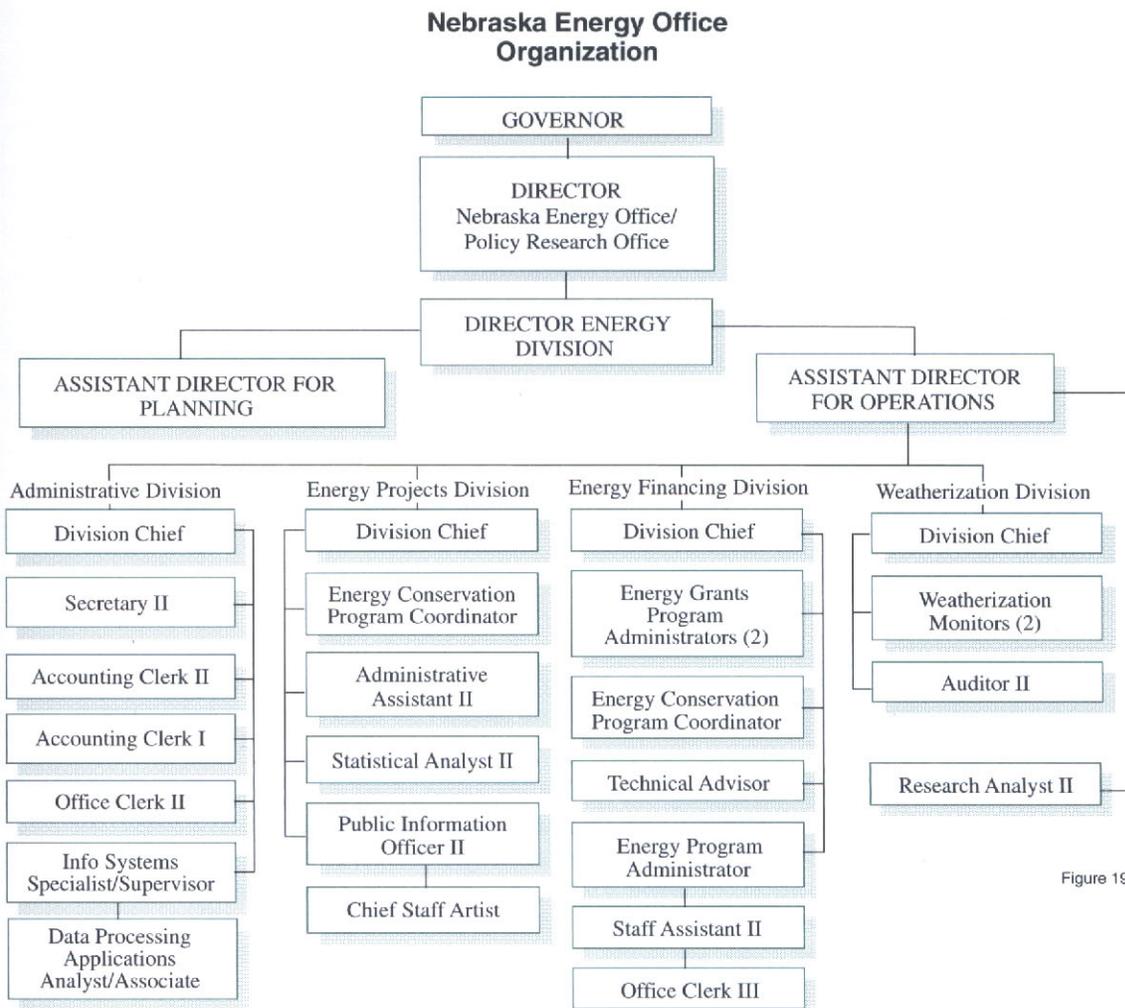


Figure 19

Source: Nebraska Energy Office

The Energy Office logo found on the back cover is from the "Genius of Creative Energy" floor mosaic by Hildreth Meiere located between the vestibule and foyer inside the north door of the State Capitol in Lincoln.

This *Annual Report* is for the period July 1, 1994, through June 30, 1995, except where noted.

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Phone: (402) 471-2867 FAX: (402) 471-3064 Email: energy@neo.state.ne.us

Copies of *Nebraska Energy Statistics, 1992-1994 Update* are also available from the Energy Office

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STATE OF NEBRASKA

Nebraska Energy Office
1200 N Street, Suite 110
Lincoln, Nebraska