

# NEBRASKA ENERGY OFFICE

*The vision of the Nebraska Energy Office is for Nebraska to have reliable and affordable sources of energy that support a cleaner environment and ensure security for our lifestyle and economy.*

*The mission of the Nebraska Energy Office is to promote the efficient, economic and environmentally responsible use of energy. Our principles are: we value teamwork, are customer oriented, believe in creativity and innovation, are committed to excellence and pursue the highest standard of professionalism and integrity in serving the state's citizens.*

*In support of the agency mission, the following goals have been adopted:*

- Advance the conservation of traditional energy resources.
- Encourage the development of alternate and renewable energy resources.
- Advise the executive and legislative branches of state government in the development of energy policy.

## The Programs

The Nebraska Energy Office operates a number of different programs. These programs can be categorized as follows: low-income weatherization, oil overcharge-funded activities, state energy program activities, organization activities and natural gas technical assistance. An overview of the 2000-2001 financial activity appears at the end of this section. The period covered by this report is from July 1, 2000 to June 30, 2001, except where noted.

### Low Income Weatherization Assistance Program



The Energy Office administers this federally-funded program for weatherizing homes to save money and energy.

Typically, the types of improvements made include wall and attic insulation and checking the energy efficiency and safety of furnaces, stoves and water heaters.

The agency is responsible for inspecting the homes that are weatherized and for monitoring and auditing the subgrantees, primarily community action agencies, that actually make the home weatherization improvements. In this reporting period, an estimated one-quarter of the homes weatherized were inspected by agency staff.

In fiscal year 2000-2001, 1,104 homes were weatherized by Energy Office subgrantees. This effort received a total of \$3,001,940 from three sources: \$1,425,273 from the U.S. Department of

Energy's Low Income Weatherization Assistance Program, \$1,543,929 from the Low Income Energy Assistance Program; and \$32,738 from *Stripper Well* oil overcharge funds.

Since the program's inception in 1979, \$79.7 million has been spent to make energy efficiency improvements in 51,804 homes. An estimated 57,000 homes of Nebraskans remain eligible for the weatherization program.

Energy savings resulting from weatherization typically last 20 years or longer. The cumulative savings since the program began are illustrated in Figure 1. Conservatively, estimated savings of \$53.9 million have been achieved. About \$4.2 million in new savings accrue annually.

### Oil Overcharge Funds



Since 1982, Nebraska has received oil overcharge funds — also called 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 was not possible, the courts ordered the money be distributed to the states and used, within parameters established by the courts and federal regulators, to fund energy assistance and efficiency programs.

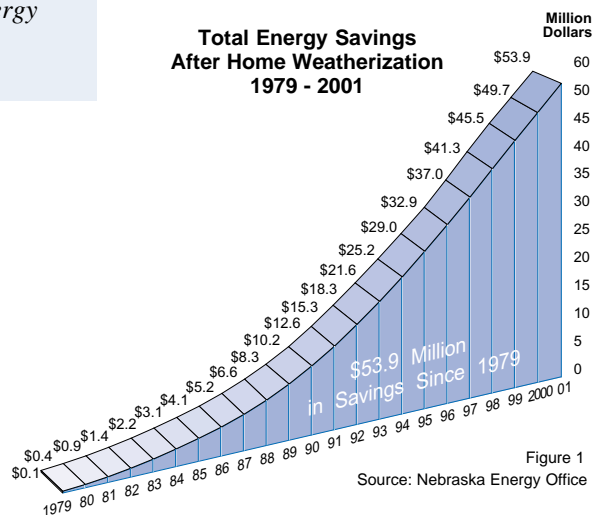


Figure 1  
Source: Nebraska Energy Office

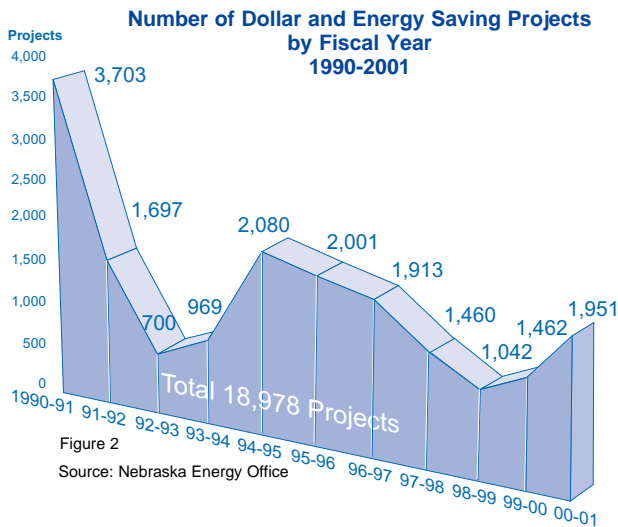


Figure 2  
Source: Nebraska Energy Office

The Legislature requires the Energy Office to annually report on disposition of these funds. A summary of activities funded with these dollars follows and is detailed in Figure 4:

### Dollar and Energy Saving Loans

This program, which was capitalized with oil overcharge funds and is re-charged with loan repayments, provides low-interest loans to Nebraskans to finance home, building, transportation and system improvements. Presently, 276 participating lenders at 666 locations provide five percent interest rate financing for up to 15 years on loans for energy saving improvements.

By June 30, 2001, 18,978 projects totaling more than \$140.047 million have been financed with low-interest loans. Of that total, the Energy Office has provided more than \$65.83 million which leveraged more than \$69.24 million from Nebraska lenders. These projects also leveraged an additional \$12.8 million spent on non-energy related improvements.

Loans have financed projects in all of the state's 93 counties. During the reporting period, 1,951 new projects were financed, an increase of 33 percent above 2000. The number of projects financed each year since 1990 are shown in Figure 2.

For reporting purposes, the agency categorizes loans into 11 types. Summaries of the major categories appear in Figure 3 and are detailed as follows:

### Agricultural Improvements

Ranking fourth in the use of low-interest financing in the use of low-interest financing have been improvements in agricultural equipment and systems. More than 6.3 percent of all loan funds have financed typical agricultural projects such as low-pressure irrigation systems,

replacing irrigation pumps and motors, making well modifications and replacing grain dryers. Since 1990, the Energy Office and lenders have financed 502 agricultural projects totaling \$8.93 million.

### Home Mortgages

The Energy Office began financing new home construction in 1996. To date, the agency and lenders have financed 129 homes which meet or surpass the 1995 Model Energy Code by up to 30 percent. In financing these projects, the agency offers inducements in the form of interest rate reductions, from ¼ to 1 percent, to encourage the construction of very energy efficient homes. The Energy Office and lenders have financed construction totaling \$17.2 million, and lenders and homeowners have financed an additional \$3.8 million on the same projects. Currently, 12.3 percent of all funds used to finance energy efficiency projects has financed mortgages for new homes.

### Residential Improvements

Nearly 92 percent of the total number of the energy efficiency projects financed are in the homes of Nebraskans. More than 68.2 percent of all the funds loaned finance residential improvements such as replacing or installing furnaces, air conditioners and heat pumps, replacing windows and doors and insulating walls and ceilings. To date, more than 17,450 projects totaling more than \$95.5 million have been undertaken by Nebraskans.

### Small Business Improvements

More than 8.7 percent of all the energy efficiency financing, \$12.2 million, has been used to make improvements in 779 buildings and systems in small businesses in the state. Typical small business improvements include replacement of furnaces and air conditioners as well as insulation, lighting and replacement doors and windows.

### Impacts and Savings

A 1997 evaluation of Dollar and Energy Saving Loans found the projects created the equivalent of 1,416 jobs between 1990 and 1996.

### Oil Overcharge Funds Invested In Types of Dollar and Energy Saving Loans as of June 30, 2001

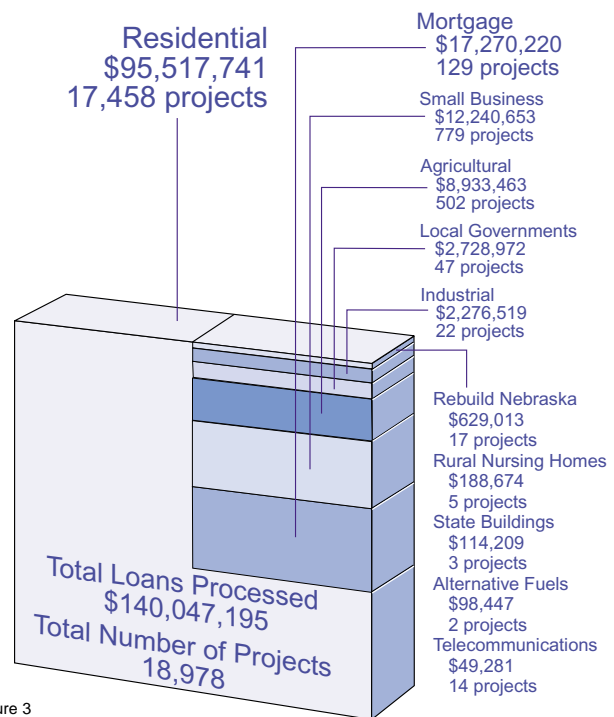


Figure 3  
Source: Nebraska Energy Office

**Nebraska Energy Settlement Fund**  
**A Summary of Exxon, Stripper Well and Diamond Shamrock**  
**Oil Overcharge Funds as of June 30, 2001**

	<i>Exxon</i>	<i>Stripper Well</i>	<i>Diamond Shamrock</i>	Total
Total Received	\$15,504,944	\$15,411,142	\$359,172	\$31,275,258
Interest Earned and Miscellaneous Income	9,304,657	6,414,958	234,365	15,953,980
<b>Total</b>	<b>\$24,809,601</b>	<b>\$21,826,100</b>	<b>\$593,537</b>	<b>\$47,229,238</b>
<b>Funds Budgeted</b>				
Contracts	\$4,002,118	\$5,890,221	\$0	\$9,892,339
Program Development	103,692	0	6,434	110,126
Monitoring/Evaluation	361,527	0	0	361,527
Education	117,292	0	0	117,292
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	4,022,371	4,201,991	0	8,224,362
Emergency Preparedness	45,907	0	0	45,907
Dollar & Energy Saving Loan Program	13,896,424	8,832,307	0	22,728,731
Loan Program Delivery	915,117	460,914	0	1,376,031
Special Projects	227,472	358,175	0	585,647
Designated Interest	1,032,390	1,309,980	0	2,342,370
Oil Overcharge Administration	0	384,199	577,917	962,116
Direct Restitution Project	0	0	9,186	9,186
Allocated to Native American Programs	\$0	\$15,187	\$0	\$15,187
<b>Low Income Designated</b>	<b>\$0</b>	<b>\$36,617</b>	<b>\$0</b>	<b>\$36,617</b>
<b>Uncommitted Balance</b>	<b>\$35,252</b>	<b>\$37,084</b>	<b>\$0</b>	<b>\$72,336</b>

Source: Nebraska Energy Office

Figure 4

Savings earned by Nebraskans who used the loans came in two forms: savings from reduced energy use and savings from lowered financing costs. Between 1990 and 1997, the dollars saved by Nebraskans from reduced use totaled \$16.9 million and savings from reduced financing charges totaled \$15.86 million.

### Low-Income Weatherization Assistance Program

During the reporting period, \$32,738 in *Stripper Well* oil overcharge funds were spent to assist Nebraskans with residential weatherization projects in accordance with the court order mandating that an equitable share of the funds be set aside for the state's low-income population.

### Native American Tribal Governments

The *Stripper Well* court order requires the state to provide an

equitable share of oil overcharge funds to Native Americans. Based on their Nebraska population, \$77,000 have been set aside for eligible projects, of which \$8,528 remains unspent.

### Other Funds

Another \$8,722 in *Diamond Shamrock* funds were spent on agency operating expenses.

### 2000 Oil Overcharge Plan

In November 2000, the agency submitted to the Legislature a pre-disbursement plan to use \$962,594 in *Exxon and Stripper Well* oil overcharge funds for three projects:

- \$677,597 (\$190,919 *Exxon* and \$486,678 *Stripper Well*) to be added to the state's low-interest Dollar and Energy Saving Loan program.
- \$269,810 (*Stripper Well*) to be added to the Low-Income Weatherization Assistance Program.

■ **[\$15,187]** (*Stripper Well*) to be allocated to Indian Tribal governments for energy programs.

### State Energy Program



In 2000-2001, Nebraska received \$324,000 for this federally-funded effort and supplied \$64,800 in state

funds from oil and natural gas severance taxes, as required matching funds.

These funds are used to provide energy efficiency services to consumers and other small energy users, and include the publication of this *Annual Report* and the *Nebraska Energy Quarterly* as well as maintenance of the state's energy database and web site.

These funds also provide program support for a wide array of activities that include energy shortage management and emergency preparedness, education and information, Dollar and Energy Saving Loans and management of competitive federally-funded Special Projects

grants secured by the agency.

A number of activities are grouped under the State Energy Program, in part, because the federal energy department primarily funds them. The activities that occurred under each special projects grant during the reporting period is documented in this section.

### Federal Energy Management Program/Army National Guard

This federal grant of \$64,500 was received in August 1999. The project allowed the Nebraska Army National Guard to hire an energy manager to implement energy savings in federal and state military buildings.

In 2000-2001, the Guard's energy manager audited four buildings totaling more than 107,000 square feet and implemented a number of energy efficiency improvements in the buildings that are expected to generate

more than \$26,000 in annual dollar savings. In this reporting period, \$27,048 were spent. This project is scheduled for completion by June 2002.

### Geothermal Heat Pump Training Program

This federal grant of \$50,000 was received in September 1999, and teams the state's three largest electric utilities — Nebraska Public Power District, Omaha Public Power District and Lincoln Electric System — with the Energy Office to provide information to school officials, architects and engineers and provide training for well drillers and installers of geothermal heat pump systems.

In 2000-2001, a geothermal workshop was held for school officials at their annual convention and 44 people received International Ground Source Heat Pump Association certification training for well drillers of whom 39 took the certification exam. During the reporting period, the agency spent \$26,793. This project is scheduled for completion by June 2002.

### Non-Traditional Approach to Model Energy Code Compliance

This 1997 grant of \$255,500 created a non-traditional financing approach to encourage Nebraskans to construct energy efficient buildings above the minimum requirements of the Model Energy Code.

In 2000-2001, the agency continued to review building plans for projects funded with state and federal dollars for compliance with relevant building codes applicable for the specific projects. Agency staff began the implementation of state legislation — LB755 — that required all new state buildings and buildings being significantly remodeled to meet the minimum requirements of the 1998 International Energy Conservation Code. The agency also began working with the Nebraska State Home Builders Association and their Green Building Focus Group to develop standards and a checklist that could be used in building homes using 40-50 percent

less energy, reducing construction waste by 25 percent and increasing use of recycled products by 25 percent. During the reporting period, \$39,276 were spent.

In total, this project encompassed the review of 1,052 living units. The federal funds also leveraged \$1.234 million in mortgage funds from private lenders. During the reporting period, \$39,276 were spent. This project ended in 2001.

### Rebuild Nebraska 2000

This grant of \$189,751 was received in September 2000 and continued the targeted community approach to commercial buildings and multi-family housing begun under earlier grants. Rebuild Nebraska is part of the Rebuild America effort that assists building owners increase energy efficiency and reduce operating costs.

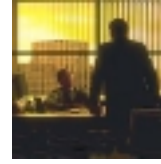
In 2000-2001, the Energy Office continued its partnership with the Nebraska Public Power District in the towns of McCook, South Sioux City and North Platte and NMPP Energy in the city of Crete. The utilities secured 59 Rebuild Nebraska partners with buildings totaling nearly ¾ of million square feet. During the reporting period, \$31,302 were spent. Activities on Rebuild Nebraska 2000 are expected to end in 2002.

### Rebuild Otoe County

This \$100,000 grant was received in 1998 and provided for a localized effort to help owners of historically significant commercial and multi-family buildings make their buildings more energy efficient without compromising architectural integrity.

One of the concluding activities under Rebuild Otoe County was the creation and publication of *Energy Efficiency and Historic Preservation: A Planning Guide for Buildings*. Under this project, 39 Rebuild partners were recruited and 37 buildings totaling nearly 270,000 square feet were audited. Reports outlining recommended improvements and ways to finance the improvements were also provided to the owners. During the reporting period, \$16,210 were spent and the activities under this grant were completed.

## Organizations



The Energy Office serves as the headquarters for four state, regional, national and international organizations:

### Governors' Ethanol Coalition

Nebraska was the driving force in this group's creation in 1991. Today, there are 27 members from Hawaii and Washington in the West to the Carolinas and Puerto Rico in the East. There are also four international members.

An Energy Office staff member is one of the Nebraska governor's representatives for the group. The Energy Office serves as the Coalition's administrative headquarters, handling fiscal, media and operational matters.

Nebraska Governor Johanns became chair of the organization in January 2001.

During the reporting period, the Coalition:

#### Governors' Ethanol Coalition Members

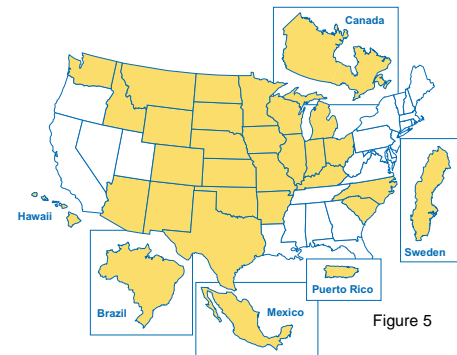


Figure 5

- Welcomed three new members: Idaho, South Carolina and Washington.
- Participated as a sponsor in the Future Truck competition. The University of Maryland's E85 entry tied for first place in the competition.
- Joined with members of the Northeast States for Coordinated Air Use Management to outline three principles for resolving the nation's reformulated gasoline formula impasse:
  - ◆ Phase-out MTBE as soon as practical
  - ◆ Allow states flexibility in meeting

reformulated gasoline standards including the use of state-level waivers at the request of a governor

- ◆ Preserving present air quality benefits
- Continued publication of the *Ethanol Alert* and maintained the Coalition's web site.
- Continued to work with the National Ethanol Vehicle Coalition to increase the number of public E85 fueling sites.

### Governors' Public Power Alliance

This bi-partisan coalition of six governors was formed so consumers served by publicly-owned electric systems would not be disadvantaged as the industry was restructured. Nearly one-quarter of the nation is served by consumer-owned systems, including all electric utilities in Nebraska.

Formed in 1998, the governors of Nebraska and Tennessee serve as co-chairs of the Alliance.

During the reporting period, the Alliance continued to monitor federal legislative restructuring activity,

#### Governors' Public Power Alliance Members

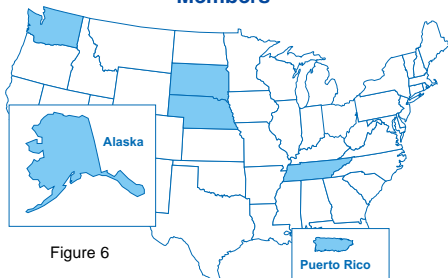


Figure 6

making its position known in a number of venues. The agency also received second year funding for a federal grant to foster the continued use of renewable energy resources in a restructured electric industry.

### Western Regional Biomass Energy Program

Since 1997, the Energy Office has administered this federal 13-state regional program. Biomass is renewable organic matter such as forest residues, agricultural crops and wastes, wood and wood wastes, animal wastes, livestock operations residues, aquatic plants and municipal wastes.

Over the years, numerous projects in Nebraska have been supported with funds from this program, especially the state's ethanol industry.

One project in Nebraska was selected for funding during the reporting period. Nebraska Public Power District and an Idaho company will explore adding a biomass gasifier to an existing coal plant.

Since the Energy Office began administering this program, \$1.725 million in grants have been spent on projects in the 13 states.

#### Western Regional Biomass Energy Program Members

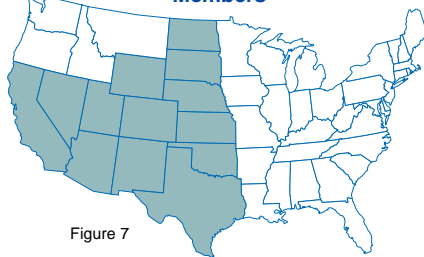


Figure 7

### Biopower Steering Committee

Created by the Legislature in 1999, the Energy Office provides assistance to this 12-member group. Its task is to foster the use of bio-based resources as energy production resources.

### Natural Gas Loans and Technical Assistance



Nebraska is only one of two states to regulate investor-owned natural gas suppliers at the local level. Village boards and city officials review rate requests under the state's *Municipal Natural Gas Regulation Act of 1987*.

The Energy Office, under the auspices of the Governor's Policy Research Office, administers the revolving loan fund that finances rate regulation. Initially the fund was capitalized with \$370,000 in severance taxes. Groups of communities borrow from the fund to finance rate studies and the fund is replenished by the regulated utilities who, in turn, bill the customers for the cost of regulation.

At the end of the 2000-2001 reporting period, the agency had approved five area hearing phase loans:

Peoples Natural Gas Rate Area Three .....	\$41,192
KN Energy Rate Area Two ....	\$84,864
KN Energy Rate Area Three ..	\$79,482
KN Energy Rate Area Four ..	\$106,119
KN Energy Rate Area Seven	<u>\$119,535</u>
TOTAL .....	\$431,192

In addition, the agency has received requests for an additional \$715,848, which is in excess of the loan fund balance.

The Energy Office is also directed to provide technical assistance to municipal officials during all phases of the regulatory process.

### Financial Activity



In 2000-2001, the income and expenditures for the agency totaled \$13,670,287 and includes federal, state, oil overcharge and miscellaneous state funds. The source of the funds is

#### Where the Money Came From as of June 30, 2001

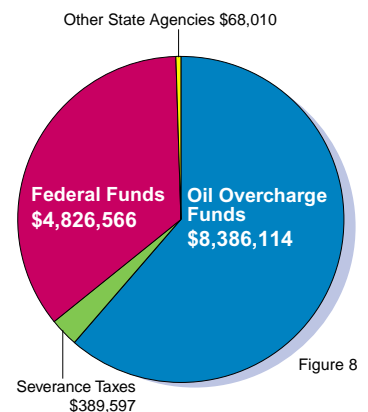


Figure 8

#### Where the Money Went as of June 30, 2001

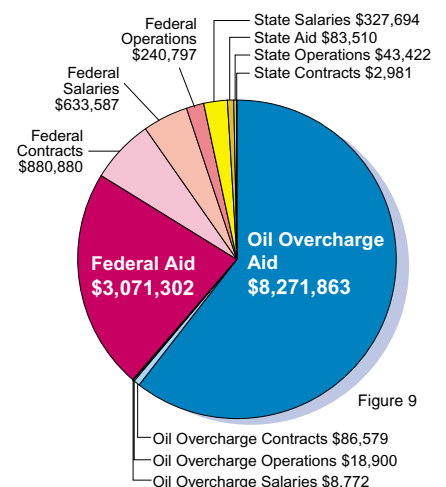


Figure 9

illustrated in Figure 8. Approximately 61 percent of the funding came from oil overcharge accounts. More than 35 percent was derived from federal sources.

About 60 percent of all expenditures were used for oil overcharge aid and are detailed on pages one through three in this report. Sixty-three percent of all federal funds were spent as aid in

the Low-Income Weatherization Assistance Program. Complete expenditure details can be found in Figure 9.

*(1) On or before February 15 of each year, the Director of the State Energy Office shall transmit to the Governor and the Clerk of the Legislature a comprehensive report designed to identify emerging trends related to energy supply, demand, and conservation and to specify the level of state-wide energy need within the following sectors: Agricultural, commercial, residential, industrial, transportation, utilities, government, and any other sector that the director determines to be useful.*

*(2) The report shall include, but not be limited to:*

*(a) An assessment of the state's energy resources, including examination of the current energy supplies and any feasible alternative sources;*

*(b) The estimated reduction in annual energy consumption resulting from various energy conservation measures;*

*(c) The status of the office's ongoing studies;*

*(d) Recommendations to the Governor and the Legislature for administrative and legislative actions to accomplish the purposes of sections 70-625, 70-704, 81-1602, 81-1606, and 81-1607; and*

*(e) The use of funds disbursed during the previous year under sections 81-1635 and 81-1641. The use of such funds shall be reported each year until the funds are completely disbursed and all contractual obligations have expired or otherwise terminated.*

*Nebraska Revised Statutes  
81-1607*

## Trends and Needs

The Nebraska Energy Office follows the trends of different energy sectors as part of its mission. These trends can portend future energy use.

In all cases, the most current energy data has been used in this report. Detailed energy data required to be maintained by the Energy Office can be found at the agency's web site <http://www.nol.org/home/NEO/statshtml/index3c.html>

### State-wide Energy Need and Cost

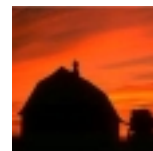


In 1998 and 1999, the state's energy need or consumption fluctuated from past patterns. In 1998, total energy consumption, after deducting for net interstate transfers of electricity and associated losses, continued historical patterns and rose by 1.3 percent from 1997 to 623.4 trillion British thermal units. However, use in 1999, reversed the upward trend and declined by 3.4 percent to 602 trillion British thermal units. Increased nuclear power production was more than offset by declines in coal and natural gas consumption.

Total energy expenditures in 1998 and 1999 fluctuated even more. In 1998, total energy expenditures declined from a year earlier by 7.9 percent to \$3.5 billion. The collapse in the prices of natural gas and petroleum accounted the bulk of the \$300 million decline. In 1999, energy expenditures rose by 2 percent to \$3.571 billion. Almost the entire increase is attributable to the recovery of petroleum prices.

According to the Energy Information Administration, Nebraska ranked 37<sup>th</sup> in 1999 in energy expenditures among the 50 states and the District of Columbia (California was first and the District was last). The state rose to 23<sup>rd</sup> in the ranking of expenditures per person at \$2,144 (Wyoming was first and Florida last).

### Agricultural Energy Supply



Energy supplies and needs for this sector of the state's economy have been met. Any supply problems have been limited to sporadic shortfalls of petroleum products in the recent past.

#### Demand

Energy demand information for the agricultural sector is not available on a consistent and annual basis. Nationally, agricultural energy data are incorporated into the industrial sector.

#### Conservation

Over the years, agricultural producers have used a number of different approaches to limit energy use. Energy reduction practices used have included conservation tillage and irrigation pump testing, scheduling and load management. The Energy Office provides low-cost financing for irrigation efficiency projects that demonstrate energy savings such as low-pressure pivots and replacement pumps and motors. Other farming and ranching energy efficiency projects can also be financed with low-interest loans.

Typically, high fuel costs or limited availability of energy resources induces demand for efficiency practices in this sector.

#### Energy Need

At one time, energy costs were the second largest agricultural expense.

As farm size has increase, energy has replaced labor allowing fewer people to produce larger volumes of agricultural goods.

The energy needs of the state's agricultural producers can fluctuate dramatically from growing season to growing season. For example, the 30 percent increase in gasoline and diesel use in 2000 was primarily due to increased irrigation use as a result of drought conditions in areas of the state.

During the planting season in spring 2001, the greatest energy concern was based on the limited availability and high costs for ammonia fertilizer which is a natural gas based product. Because of the fall in natural gas prices, this problem is not expected to be a factor during the 2002 planting season.

Fuel substitution or conversion to other types of fuel are very difficult for this sector.

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## Commercial



This sector which includes non-manufacturing business establishments closely parallels consumer economic activity in the state and includes local, state and federal governments.

### Energy Supply

In each year between 1997 and 1999, more than 94 percent of the energy used in this sector came from only two sources: natural gas and electricity. Supplies of both energy resources have been plentiful. However, prices for natural gas have departed substantially from historic and stable price patterns.

Trends indicate these fuel types will remain the predominant fuel choices of this sector in the near term.

### Demand

The trend of the most recent three years, 1997-1999, has deviated from a fairly predictable route that prevailed earlier in the decade: steadily rising consumption. Percentage declines of 4.5 percent were recorded in 1998 and 1999. In 1998, coal and natural gas

demand accounted for the decline, and in 1999, natural gas and electric system losses accounted for the decline.

The drop in natural gas use in 1998 and 1999, when prices were very low, likely came from two sources: efficiency improvements and declines in economic activity in this sector.

### Conservation

Reductions in energy use in the commercial sector generally follow patterns found in the residential sector. Efforts to conserve energy use tend to be economically driven, especially when fuel prices rise above historic levels.

### Energy Need

Because the predominant energy needs of the commercial sector are confined to readily available supplies of natural gas and electricity, no supply problems are likely if natural gas supplies stabilize or outpace demand.

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## Residential



### Energy Supply

More than 91 percent of the energy used in the residential sector in 1998 and 1999 came from two sources: electricity and natural gas. In the past several years, more than half the energy used in this sector comes from natural gas.

There are available supplies of both sources of energy.

### Demand

Demand in the residential sector has fallen by nearly 10 trillion British thermal units between 1997 and 1999. In 1998, residential energy demand fell 3.0 percent and fell another 4.1 percent in 1999. Nearly the entire decline in 1998 came from natural gas use and the decline in 1999 was primarily attributed to electric system losses.

### Conservation

Most natural gas in the residential sector is used for heating and minor household use such as heating water, drying clothes and cooking.

Like most of the other sectors, residential users are extremely responsive to dramatic price rises. Increases

in the price of natural gas, at various times over the decades, have resulted in reduced average annual consumption. Higher than normal heating bills have propelled homeowners to make energy saving improvements such as replacing furnaces and adding insulation.

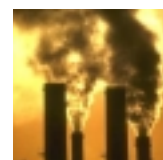
The 40-year trend of increasing use of electricity in households, from 6.51 trillion Btus in 1960 to 27.06 trillion Btus in 1999, illustrates the wide adoption by Nebraskans of energy-using technologies such as televisions, microwave ovens and computers.

### Energy Need

Energy need in this sector for the two major fuel types — natural gas and electricity — is likely to be determined in predictable ways: severity of winter weather and price volatility. The combined impact of a return to normal winter weather patterns coupled with high natural gas prices — as occurred in 2000-2001 — would likely result in predictable behavior: a surge in replacement of inefficient heating equipment, reduction in use, and fuel switching by replacing natural gas furnaces with electric-powered heat pumps.

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## Industrial



The industrial sector includes manufacturing, construction, mining, agriculture and forestry operations.

### Energy Supply

The industrial sector relies on more diverse types of fuel than other sectors. Natural gas, electricity and various petroleum products — gasoline, propane, diesel — are the primary energy inputs utilized in this sector's operations. Generally, supplies of all fuel types have been readily available.

### Demand

In nearly four decades, from 1960 to 1999, total energy demand has grown by more than 79.2 percent. Significant growth in demand was registered for electricity, propane and diesel fuel while declines were recorded for coal and gasoline.

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## Conservation

Over the years, the industrial sector has been more predisposed to make energy efficient system and building improvements, especially if energy costs are a significant factor in the cost of doing business.

The impact of conservation efforts are most clearly seen in natural gas use in this sector when usage peaked in 1973 at 73.7 trillion Btus. Demand subsequently fell precipitously after the oil price shocks to a low of 20.3 trillion Btus in 1986.

## Energy Need

Energy need in the industrial sector is also subject to the ebb and flow of national and regional economic trends which can cause spikes or declines in energy demand.

Growth trends in this sector can also be affected by industrial expansions in the state. For example, the significant increase in ethanol production in the mid-1990s caused a substantial increase in natural gas need in this sector.

Based on past use patterns, projections of energy need by this sector are likely for electricity. Energy need for other energy resources is impossible to predict.

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## Transportation



In addition to traditional methods of transportation — public and private vehicles, aircraft and boats — this sector includes natural gas used to transport natural gas through pipelines.

## Energy Supply

The transportation sector in Nebraska is almost exclusively dependent upon petroleum based fuels. This level of dependency has not essentially changed since 1960, when record-keeping began.

## Demand

Demand in this sector has more than doubled since 1960, rising from 87.8 trillion Btus to 185.5 trillion Btus in 1999. Demand for diesel fuel has increased more than nine-fold in the same period from 8.17 trillion Btus to

76.9 trillion Btus in 1999. Gasoline and diesel fuel account for 97 percent of the resource types used in the transportation sector.

In the last five years, growth in demand in this sector has averaged between 2-3 percent a year. Factors that affect growth in this sector include population growth, replacement of vehicles with less efficient ones and the number of miles traveled a year.

## Conservation

The transportation sector is especially immune to conservation efforts. Over the decades, a variety of approaches by the state and federal governments have been tried: mandated Corporate Average Fuel Efficiency standards, reduced highway speed limits, introduction of efficiency technology in vehicles, and driving modifications such as right-turn-on-red lights.

Recent trends in this sector have run counter to conservation efforts. Price rises can induce conservation behavior, but typically the actions are sporadic and have not been sustained in the long term.

## Energy Need

Based on past demand trends in this sector, continued growth in energy use in this sector seems likely.

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## Utilities



Information in this sector consists exclusively of energy trends and needs by the state's electric utility sector.

## Energy Supply

Trends in the electric utility sector in Nebraska have remained generally constant over time: More than 90 percent — 93 percent in 1999 — of the fuels used to generate, distribute and transmit electricity has come from just two resource types: coal and nuclear. In-state hydropower resources used to generate electricity have also remained constant over the recent past, averaging about 5 percent a year.

## Demand

Since 1960, energy demand by electric utilities has increased more than six-fold from 49.7 trillion Btus to 320.6 trillion Btus in 1999. Increase in demand has been recorded each year in the past five years. Demand between 1995 and 1999 grew 18.5 percent.

## Conservation

Efficiency efforts in the electric utility sector result from technological advances, either by the utility or the user.

One key target of efficiency improvements for utilities is reducing electricity losses during transmission. While technological breakthroughs can address part of the problem, other improvements can also be made. For example, local utilities estimate standard line loss at seven percent, but in some cases actual losses can be more than double that amount if preventive maintenance is not performed on a regular basis on the utility lines.

Between 1995 and 1999, estimated average line losses in Nebraska ranged from more than 10.5 billion kilowatthours in 1995 to 19.1 billion kilowatthours in 1999, and appears to be growing.

## Energy Need

Nebraska utilities remain net exporters of electricity. Between 1995 and 1999, the amount of electricity exported has increased each year, reaching a peak of 7.2 billion kilowatthours in 1999, up 29 percent from 1998.

In time, however, continued growth in need will result in additional capacity requirements. Several of the state's largest utilities have begun the planning process for adding generation assets. For new base load and peaking facilities the utilities are planning on using coal and natural gas, respectively, and they have also identified smaller generation options using wind and biogas.



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## State Energy Resources Assessment



### Current Supplies

Nebraska is not an energy resource-rich state.

Oil has been produced in the state since 1939. Oil production peaked in 1962 and has declined significantly since then. Since 1998, oil production, as measured on an annual basis, has mostly declined, falling from 3.175 million barrels in 1998 to 2.955 million barrels in 2000 — a 6.9 percent fall over the three-year production period. In 1999, the state's crude oil production represented only 5.8 percent of the petroleum products used in the state in that year.

Natural gas has been produced in the state since 1951. Natural gas production peaked in 1960 and has declined precipitously since with only minor increases in production, the last one occurring in 1998. Between 1998 and 2000, natural gas production declined from 1997 levels by 27.0 percent from 1.670 billion cubic feet in 1997 to 1.218 billion cubic feet in 2000. In 2000, natural gas production represented about 1 percent of the natural gas consumed by Nebraskans.

The state's coal resources are insignificant and not economical to mine. However, the state's proximity to Wyoming's low-sulfur coal beds in the Powder River Basin allows Nebraska ready access to this resource used in electricity production.

Uranium has periodically been mined in the state, but must be sent outside the state's border for processing.

Five wind turbines at three locations are now operational and produce enough electricity to meet the needs of an estimated 1,000 homes and a portion of the needs of a manufacturing facility.

### Feasible Alternatives

There are five main alternate energy sources available in Nebraska: biomass, geothermal, hydropower, solar and

wind. Maps and other specific information about the state's alternative energy resources can be found at [http://www.eren.doe.gov/state\\_energy/mystate.cfm?state=ne](http://www.eren.doe.gov/state_energy/mystate.cfm?state=ne)

In 1999, the Energy Information Administration estimated alternate energy sources supplied 3.5 percent of the state's energy need. Approximately 80 percent of the alternate energy supplied in 1999 came from hydropower sources.

Assessments of the five feasible alternatives follow:

#### *Biomass*

In 1998 and 1999, wood and wood waste provided approximately 0.5 and 0.6 percent, respectively, of the state's energy need.

The only other biomass energy resource used in measurable volumes in the state is ethanol which is added to gasoline in 10 percent and 85 percent blends. Between 1998 and 2000, the amount of ethanol blended gasoline consumed in the state rose from 189.026 million gallons to 295.453 million gallons, a rise of 56.3 percent.

The seven operating plants in Nebraska produced an estimated 321.5 million gallons of ethanol in 2000.

In an average year, about 1/5th of the state's corn crop and the equivalent of 3/4ths of the state's grain sorghum crop provide the biomass material for ethanol production.

#### *Geothermal*

There are two types of geothermal resources that can be utilized: hydrothermal fluid resources and earth energy. According to the Energy Information Administration, there are two pockets of high-temperature resources in the north central and northern Panhandle portions of the state. This resource might be suitable for electricity generation. Development of these resources appears unlikely in the foreseeable future.

Earth energy, however, can be used directly to provide heat in a variety of applications, and appears to offer Nebraskans a way to utilize this resource. Growth in the use of geothermal heat pumps that can

discharge waste heat into the ground in hot weather and extract heat from the ground during cold weather appears strong and is being promoted by the state's larger electric utilities.

#### *Hydropower*

In 1998, 1999, and 2000, 7.3, 7.5 and 6.3 percent, respectively, of the state's electricity needs were met from hydropower resources coming from the 11 dams in or on the border of the state and from power supplied by Western Area Power Administration. Typically, the amount of hydropower generated remains somewhat constant, but the state's need continues to grow. Over time, the amount of electricity coming from this resource will likely decline.

According to a study by the Energy Information Administration and the Idaho National Engineering and Environmental Laboratory, an estimated 2.348 million megawatt hours of electricity could be produced from hydropower resources, meeting about 8 percent of the state's electricity needs in 1998. At this time, however, it is unlikely any additional hydropower resources will be developed.

#### *Solar*

According to the Energy Information Administration, Nebraska has good solar resources especially in the western part of the state. Based on that assessment, the federal agency estimated that a flat panel photovoltaic system the size of a football field would generate enough electricity to meet the needs of more than 103 households. A tracking-type photovoltaic system installed in western Nebraska on 150 acres would generate enough electricity to meet the needs of more than 4,330 households.

Current solar technology deployed by utilities in the state are limited to meeting the needs of cattle ranchers in remote regions where photovoltaic systems are less expensive than installing new power lines.

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## Wind

An Energy Information Administration analysis of Nebraska's wind resources concluded approximately 46 percent of the state contained good wind speeds suitable for development. If all of these resources were developed, only 4.6 percent of the land would be used, and an estimated 869 million megawatt hours of electricity could be produced annually.

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## Estimated Energy Consumption Reduction



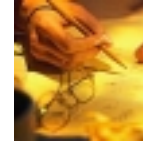
Several evaluations have been conducted by the Energy Office that quantified energy consumption reductions that resulted from activities sponsored by the agency:

- A typical home weatherized under the agency's federally-funded program achieves a 25 percent or greater reduction in space heating needs, and saves an estimated \$152 a year in energy costs.

- Replacement natural gas fueled furnaces installed and financed with Dollar and Energy Saving Loans from the agency realized a 10.7 percent reduction in energy use for 80 percent efficient furnaces and 19.2 percent reduction in energy use for 90 percent efficient furnaces.

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## Status of Ongoing Studies



The agency had no ongoing studies underway during this reporting period.

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