

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: 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.
- Utilize the Internet and computer technology to augment the delivery of information and services.

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 and organization activities. An overview of the 2003-2004 financial activity appears at the end of this section. The period covered by this report is from July 1, 2003 to June 30, 2004, except where noted.

Low Income Weatherization Assistance Program



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

Generally, 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 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 2003-2004, 1,331 homes were weatherized by Energy Office subgrantees. This effort received a total of \$4,946,485 from two sources: \$2,561,263 from the U.S. Department of Energy's Low Income Weatherization Assistance Program and \$2,385,222 from

the Low Income Home Energy Assistance Program.

Since the program's inception in 1979, \$93.11 million has been spent to make energy efficiency improvements in 55,765 homes. An estimated 54,000 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 \$66.5 million have been achieved. About \$4.2 million in new savings accrue annually.

Oil Overcharge Funds



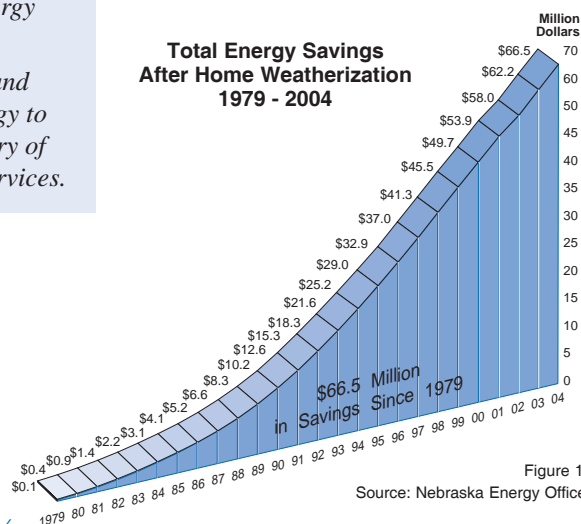
Since 1982, Nebraska has received oil overcharge funds — also called petroleum violation escrow funds — as a

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.

The Legislature requires the Energy Office to annually report on disposition of these funds. A summary of Nebraska Energy Settlement Fund activities follows and is detailed in Figure 4 on page 3.

Dollar and Energy Saving Loans

This program, which was capitalized with oil overcharge funds and is recharged with loan repayments, provides low-interest loans to Nebraskans to



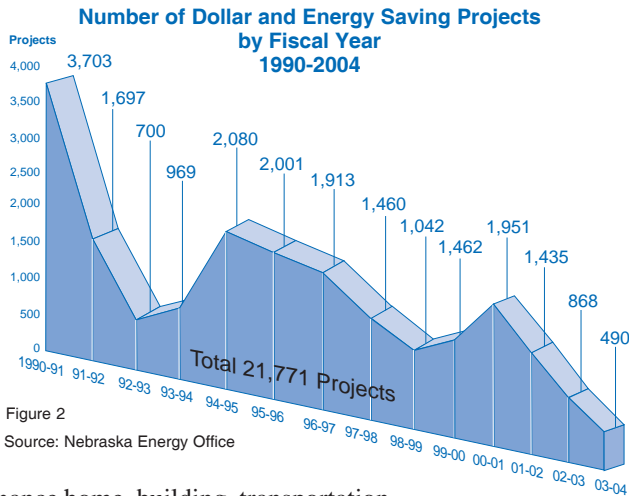


Figure 2
Source: Nebraska Energy Office

finance home, building, transportation and system improvements. Presently, 251 participating lenders at 699 locations provide five percent interest rate financing for up to 15 years on loans for energy saving improvements.

By June 30, 2004, 21,771 projects totaling more than \$183.2 million have been financed with low-interest loans. Of that total, the Energy Office has provided more than \$78.4 million which leveraged more than \$81.8 million from Nebraska lenders. These projects also leveraged from borrowers an additional \$14.4 million that was spent on non-eligible related improvements.

Loans have financed projects in all of the state's 93 counties. During the reporting period, 490 new projects were financed. The number of projects financed each year since 1990 is shown in Figure 2.

For reporting purposes, the agency categorizes loans into 10 types. More than 93 percent of the loan funds have financed improvements in just four categories: agriculture, mortgages, residential and small business. Summaries of several major loan categories appear in Figure 3 and are detailed as follows:

Agricultural Improvements

Improvements in agricultural equipment and systems rank fourth in the use of low-interest financing. More than 6.1 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 556 agricultural projects totaling \$10.287 million.

Residential Improvements

More than 92 percent of the total number of the energy efficiency projects financed are in the homes of Nebraskans.

More than 68.6 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, 20,120 projects totaling more than \$115.832 million have been undertaken by Nebraskans.

Small Business Improvements

More than 6.2 percent of all energy efficiency financing, \$10.594 million, have been used to make improvements in 777 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.

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, \$92,187 have been set aside for eligible projects. During the reporting period, \$45,373 was obligated to the Ponca Tribe of Nebraska for making energy saving improvements — replacing light fixtures and ballasts, 57 windows and installing two air conditioners —

at the Fred Leroy Health Center in Omaha. When this project is completed in 2005, all *Stripper Well* funds for Native Americans will have been spent.

Other Funds

Another \$1,813 in *Diamond Shamrock* funds were spent on agency operating expenses.

State Energy Program



In 2003-2004, Nebraska received \$436,000 for this federally-funded effort and supplied \$87,200 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,

Oil Overcharge Funds Invested In Types of Dollar and Energy Saving Loans as of June 30, 2004

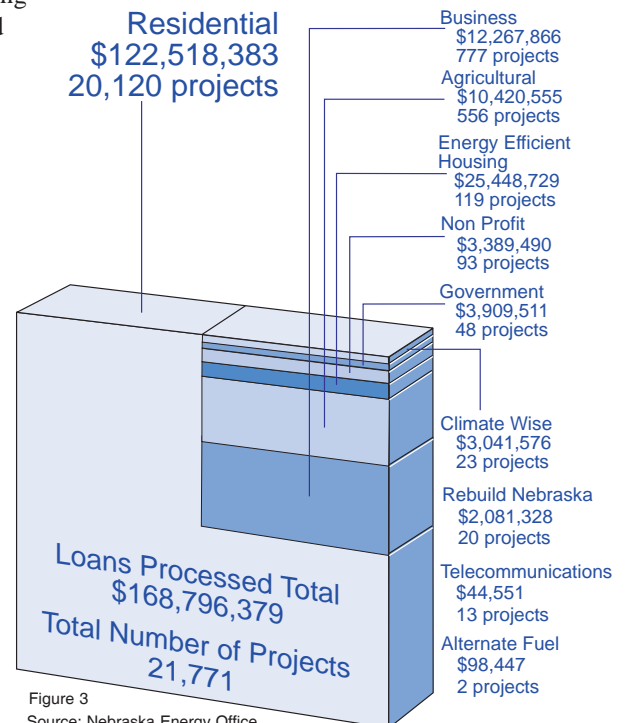


Figure 3
Source: Nebraska Energy Office

**Nebraska Energy Settlement Fund
A Summary of Exxon, Stripper Well and Diamond Shamrock
Oil Overcharge Funds as of June 30, 2004**

	<i>Exxon</i>	<i>Stripper Well</i>	<i>Diamond Shamrock</i>	Total
Funds Received	\$15,504,944	\$15,411,142	\$359,172	\$31,275,258
Interest Earned and Miscellaneous Income	\$9,722,261	\$7,172,312	\$308,527	\$17,203,100
Total	\$25,227,205	\$22,583,454	\$667,699	\$48,478,358
Funds Budgeted	\$25,227,205	\$22,435,784	\$667,699	\$48,330,688
Low Income Designated	\$0	\$84,082	\$0	\$84,082
Uncommitted Balance	\$0	\$63,588	\$0	\$63,588

Source: Nebraska Energy Office

Figure 4

education and information, Dollar and Energy Saving Loans, residential and commercial building energy efficiency and management of competitive federally-funded State Energy Program 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.

Applying *Building America* Strategies to Buildings

This project was financed, in part, with a SEP *Building America* Special Projects grant totaling \$99,334 received in October 2003. In collaboration with its design partner, the agency will design and build a value-engineered green built affordable home. The home will be constructed by a certified green builder and will serve as a learning and training tool for builders, subcontractors and suppliers.

During the reporting period, the agency considered and evaluated several designs, selecting one for development and began work to secure construction financing, locate a lot for the home and solicitation of a qualified builder. To date, \$3,006 have been spent. This project is scheduled for completion by September 2005.

Putting the Pieces Together in Nebraska

This \$29,855 SEP Special Projects *Building America* grant from the U.S. Department of Energy was received in

September 2002. An Energy Office partner, the Nebraska State Home Builders Association will advance the knowledge and technical skills of its members through training and education for home remodelers and production builders.

During the reporting period, several workshops on addressing mold and moisture problems were held for builders and remodelers in the state. At an affordable housing conference, attendees were presented with information about *Building America* concepts and the use of value engineering in home construction. To date, \$14,737 have been spent. This activity is scheduled to be completed in August 2005.

Create High Performance Buildings

A \$125,000 *Rebuild America* grant was received from the U.S. Department of Energy in August 2002. The Energy Office and its partners, the University of Nebraska and the Omaha Public Power District demonstrated the Continuous Commissioning Leading Retrofit ProcessSM using two case studies. This process allows building owners to make major energy efficient improvements with no or little initial capital investment.

Energy evaluations in 36 commercial buildings totaling more than 10.6 million square feet were conducted. Building owners invested \$14.3 million to make energy improvements, and expect to realize \$3.2 million in yearly savings. A complete summary of the project is at http://www.neo.state.ne.us/reports/build_am_project_rept.pdf. This project was completed in 2004.

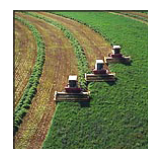
Develop Materials for the Adoption of New Energy Codes

A \$100,000 Building Technology/Codes and Standards special project grant was received September 2002 from the U.S. Department of Energy. The Energy Office and its partner, the University of Nebraska completed a survey of local codes and building practices and the types and sizes of homes being built and analyzed energy savings, construction costs and economic

benefits resulting from updated building codes.

The study's findings were clear: An upgrade to the 2000 International Energy Conservation Code from the 1983 Model Energy Code would generate dollar savings from reduced energy use in excess of any mortgage payment increases due to higher construction costs. The difference would mean a Nebraska homeowner could save between \$50 and \$295 a year, depending on where the homeowner lived. The complete report is at http://www.neo.state.ne.us/reports/unl_mec_study.htm. This project was completed in August 2003.

Other Projects



Some projects undertaken by the Energy Office are funded by other sources in the U.S. Department of Energy.

Biomass Roadmap

A \$30,000 grant from the U.S. Department of Energy was received in October 2002 to begin the development of a Nebraska-based Biomass Roadmap. As part of the development process, Nebraskans were surveyed in eight biomass areas: agricultural residues, biodiesel, ethanol, methane, biopower, tallow, switchgrass and bioproducts. A web site, <http://zoped.unl.edu/websites/Biomass/>, incorporating the roadmap development was also created. At the end of the reporting period, \$14,320 have been spent. This project is scheduled to conclude in September 2004.

Biopower Steering Committee

A \$24,000 grant from the U.S. Department of Energy was received in October 2002 to support activities of the state's Biopower Steering Committee, which was created in 1999. No state funds have ever supported Committee activities. Information about the Steering Committee is at <http://www.neo.state.ne.us/renew/biomass-biopower.htm>. At the end of the reporting period, \$12,266 have been spent. This project is scheduled to conclude in September 2004.

Clean Cities: Omaha Public Power District's Power Drive

A \$3,000 Clean Cities grant from the U.S. Department of Energy supported this program to educate and challenge high school students to design and build electric vehicles for competitions. During the reporting period, more than 68 high schools participated in seven rallies. Co-sponsors included the Nebraska Department of Education, Nebraska Public Power District, and Omaha Public Power District. More information about this activity is at <http://ww1.oppd.com/edu/powerdrive/index.cfm>

Energy Star

In April 2003, the agency received a \$10,000 grant from the U.S. Department of Energy to promote ENERGY STAR® labeled products as part of the Nebraska Green Building Program's training and information activities to increase energy efficiency and environmental actions in new construction and remodeling in the residential sector.

ENERGY STAR® is a joint effort of the Environmental Protection Agency and the U.S. Department of Energy to identify the most energy efficient appliances, lighting, heating and cooling equipment.

During the reporting period, the agency promoted ENERGY STAR® materials at workshops, home shows and local Parade of Homes events. To date, \$7,155 have been spent. This project ends in June 2005.

High Resolution Wind Resource Maps

This project will result in the creation of high resolution wind

resource maps of Nebraska. By June 2005, new maps showing mean annual and seasonal wind speed, wind power density and other key factors at multiple elevations above ground level will be available in electronic format.

This project is financed with \$20,800 from U.S. Department of Energy funds, and contributions from Municipal Energy Agency of Nebraska, \$300; Nebraska Public Power District, \$2,000; and Omaha Public Power District, \$1,900.

State Heating Oil and Propane Program

During the reporting period, the Energy Office began its third year of participation in the U.S. Department of Energy's State Heating Oil and Propane Program. This activity collects price information from a sampling of Nebraska suppliers selected by the Energy Information Administration from October through March which, in turn, is shared with the Energy Information Agency and then posted on the agency's web site at <http://www.neo.state.ne.us/statshtml/86.html> and <http://www.neo.state.ne.us/statshtml/87.html>. The U.S. Department of Energy provided a grant of \$6,000 for this activity. By the end of the reporting period, all funds were expended and the project was completed.

Wind Powering America — 2003

A \$20,000 Wind Powering America grant was received in October 2003 from the U.S. Department of Energy. Half of the grant funds were used to partially underwrite a deliberative poll by Nebraska Public Power District to ascertain customers' support for renewable energy. Other activities included coordinating informational meeting on USDA renewable energy grants and development of a web site, <http://www.nmppenergy.org/KimballWindProject/index.htm>, for the Municipal Energy Agency of Nebraska's wind energy project at Kimball. At the end of the reporting period, \$17,803 were spent. This activity was scheduled for completion in September 2004.

Wind Powering America — 2004

This \$20,000 Wind Powering America grant was received in April 2004 from the U.S. Department of Energy. With this grant, a web site for Nebraska Public Power District's Ainsworth wind project will be developed, the agency's web-based wind energy resources will be upgraded and USDA renewable energy grants will be promoted. As of June 30, 2004, no funds have been spent. This project is scheduled to be completed June 30, 2005.

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 the Coalition's creation in 1991. Today, there are 30 members from Hawaii, Oregon and Washington in the West to the Carolinas in the East. There are also five international members. The members are identified in Figure 5.

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.

During the reporting period, the Coalition:

- Worked on the passage of the energy bill which included a provision which would triple the use of ethanol in the United States. The ethanol provisions in the energy bill would also:
 - ◆ Eliminate the oxygen requirement in reformulated gasoline,
 - ◆ Ban MTBE — methyl tertiary butyl ether — over four years,
 - ◆ Create the renewable fuel standard that triples the amount of ethanol used in gasoline over ten years,
 - ◆ Extend the small ethanol production tax credit to farmer-owned cooperatives and

Governors' Ethanol Coalition Members

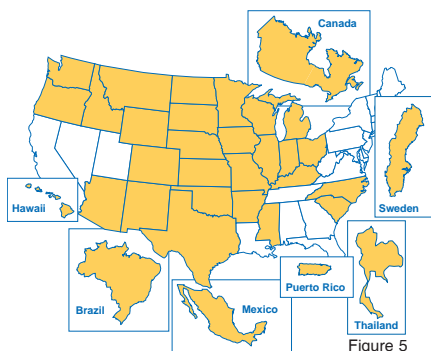


Figure 5

- ◆ Extend federal income tax credits to retailers who sell 85 percent ethanol blends.
- Maintained the Coalition's web site at <http://www.ethanol-gec.org>
- 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 electric industry was restructured. Nearly one-quarter of the nation is served by consumer-owned systems, including all electric utilities in Nebraska.

Governors' Public Power Alliance Members

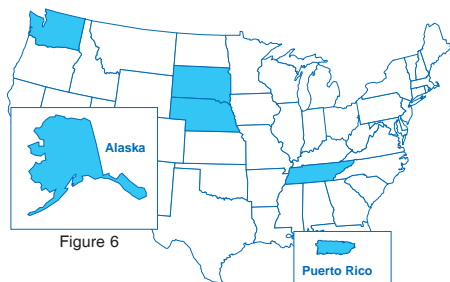


Figure 6

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 — especially the comprehensive energy bill considered by Congress — making its position known in a number of venues.

Western Regional Biomass Energy Program

Since 1997, the Energy Office has had a variety of roles for the federally-funded Western Regional Biomass Energy Program: grant recipient, administrator of the 13-state region, and host and maintenance operator of the program's web site at <http://www.westbioenergy.org/>

The future of regional biomass programs is uncertain since the U.S. Department of Energy is restructuring its role in the development of biomass energy. Grants in the Western region ended in 2003.

Biopower Steering Committee

Authorized by the Legislature through 2008, the Energy Office provides assistance to this 12-member group. The Committee's task is to foster the use of bio-based resources as energy production resources.

Natural Gas Loans and Technical Assistance



In 2003, the Nebraska Unicameral passed the *State Natural Gas Regulation Act* which authorized the Nebraska Public Service Commission to regulate rates and service quality of investor-owned natural gas utilities in the state. Publicly-owned natural gas utilities are regulated by their elected or appointed boards. With the passage of the law, the role the Energy Office had in assisting the state's cities and villages regulate natural gas utilities ceased in May 2003.

As part of the transfer of responsibilities to the Public Service Commission, the Energy Office worked to settle issues related to outstanding loans. In June 2004, Kinder Morgan remitted \$590,000 to the Nebraska Public Service Commission as part of a complex settlement agreement which resolved those issues.

Financial Activity



In 2003-2004, the expenditures for the agency totaled \$9,056,552 and includes federal, state, oil overcharge and miscellaneous state funds. The source of the funds is illustrated in Figure 7. More than 67 percent was derived from federal sources. Nearly 29 percent of the funding came from oil overcharge accounts.

More than 56 percent of all federal funds were spent as aid in the Low-Income Weatherization Assistance Program. More than 28 percent of all expenditures were used for oil overcharge aid primarily in the form of Dollar and Energy Saving Loans and are detailed on pages one through three in this report. Complete expenditure details are found in Figure 8.

Where the Money Came From as of June 30, 2004

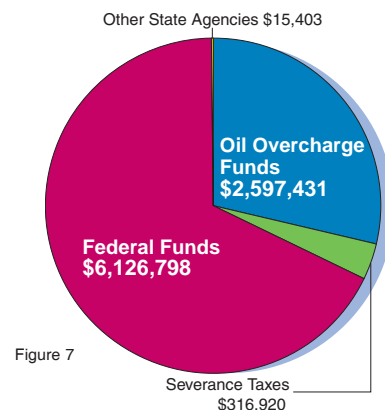


Figure 7

Where the Money Went as of June 30, 2004

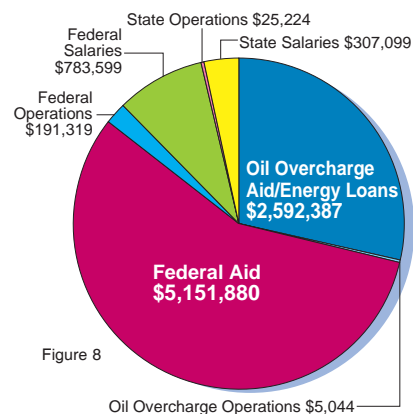


Figure 8

(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 in 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.neo.state.ne.us/statshtml/index3c.html>

State-wide Energy Need and Cost



In 2000, the state's total energy consumption was 583.5 trillion British thermal units, a decline of 3.3 percent from 1999. Declines from 1999 levels were recorded for nuclear power, 14.7 percent; renewables, 6.4 percent; and petroleum, 8.4 percent. Coal and natural gas use increased 4.3 percent and 3.4 percent, respectively. (2000 is the most recent year for which consumption, expenditure and price data are available.)

Total energy expenditures in 2000 soared 21 percent above 1999 figures to \$4.323 billion. Dramatic rises in expenditures for petroleum, which accounted for 74 percent of the expenditures, and for natural gas, which accounted for 21 percent, were responsible for the \$748 million increase from 1999.

The prices for different types of energy, as compared to other states, reveals Nebraskans paid the lowest price for coal in the nation in 2000, and less than half the national average. The rankings are calculated by the Energy Information Administration (EIA). Electricity at 42 in price, and gasoline at 37 in price, were little changed from rankings in 1999. Natural gas, another key energy source for Nebraskans, ranked 31 in price.

According to the EIA, Nebraska ranked 37 in 2000 in total energy expenditures among the 50 states and the District of Columbia (Texas was first and the District was last). The state was 24 in the ranking of expenditures per person at \$2,526 (Louisiana was first and Florida was last).

Agricultural Energy Supply



Energy supplies for the agricultural sector of the state's economy have been met. Any supply problems have been limited to infrequent shortfalls of petroleum products usually during periods of peak demand.

Demand

Energy demand information for the agricultural sector is not available on a consistent and annual basis. National energy databases merge agricultural energy use with data from the industrial sector.

Conservation

Over the years, agricultural producers have used a number of different approaches to conserve 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 such as grain dryers have also been financed with low-interest loans.

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

For example, record high prices for natural gas and diesel fuel have caused farmers to alter their current practices such as when and how much anhydrous ammonia fertilizer, a natural gas product, is used. To combat high diesel fuel prices, some farmers are adopting conservation tillage practices.

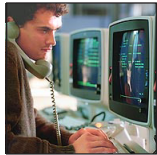
Energy Need

At one time, energy costs were the second largest agricultural expense. As farm size has increased, 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, a 30 percent increase in gasoline and diesel use in 2000 was primarily due to increased irrigation use as a result of drought conditions in some areas of the state.

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

Commercial



This sector which includes non-manufacturing business establishments closely parallels consumer economic activity in

the state and includes energy use by local, state and federal governments.

Energy Supply

For the most recent four year reporting period, 1996-2000, at least 93 percent of the energy used in this sector came from only two sources: natural gas and electricity. Supplies of both energy resources were plentiful. However, prices for natural gas departed substantially from historically stable price patterns.

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

Demand

A multi-year trend of declining demand in the commercial sector was broken in 2000. Net energy use increased nine percent to 62.8 trillion British thermal units. Total energy use also increased by three percent to 113.8 trillion Btus. Increases in demand were reported across all types of fuel: electricity, up nine percent from 1999; natural gas up four percent; petroleum use up 58 percent; and renewable energy use up one percent.

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 are available.

Residential



Energy Supply

More than 87 percent of the energy used in the residential sector in 2000 came from only two sources: electricity and natural gas. More than half the energy used in this sector comes from natural gas. There are available supplies of both types of energy.

Demand

Demand in the residential sector reversed a multi-year trend in 2000, which resulted in a small increase in net energy use of 4.2 percent over 1999 to 80.3 trillion British thermal units. Substantial increases in 2000 were reported in electricity, up 5.3 percent and natural gas, up 3.4 percent.

The 40-plus-year trend of increasing use of electricity in households, from 6.51 trillion Btus in 1960 to 28.48 trillion Btus in 2000, illustrates the wide adoption by Nebraskans of energy-using technologies such as televisions, microwave ovens and computers.

Conservation

Most natural gas in the residential sector is used for home heating and minor household uses 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, windows and adding insulation.

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 and summer weather conditions 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. A string of 100 degree summer days can also lead to replacement of broken or old air conditioners with new energy efficient models which can reduce energy use.

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 and diesel — are the primary energy types utilized in this sector's operations. Generally, supplies of all fuel types have been readily available.

Demand

In four decades, total energy demand in this sector has grown from 85.53 trillion Btus in 1960 to 123.30 trillion Btus in 2000. Demand grew significantly for electricity, propane and diesel fuel while declines were recorded for coal and gasoline over the 40-year period.

Conservation

Over the years, the industrial sector has been more likely 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 energy price shocks of the 1970s 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, increased need for electricity by this sector is likely. Energy need for other energy resources is impossible to predict.

Transportation



In addition to traditional methods of transportation — public and private vehicles, aircraft and boats — this

sector includes energy 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 on petroleum has not essentially changed since 1960, when record-keeping began.

Demand

Demand in this sector nearly doubled since 1960, rising from 94.2 trillion Btus to 174.7 trillion Btus in 2000. In 2000, net energy demand decreased by 10 percent from 1999, falling from 194.4 trillion British thermal units. Demand for diesel fuel increased more than seven-fold in the same period from 8.17 trillion Btus to

60.1 trillion Btus in 2000. Gasoline and diesel fuel account for nearly 93 percent of the resource types used in the transportation sector. Ethanol is now the fastest growing fuel type in transportation.

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 and carpooling/ridesharing.

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

Energy Need

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

Utilities



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

Energy Supply

Trends in the electric utility sector in Nebraska have remained generally constant over time: more than 90 percent — 93 percent in 2000 — 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 also remained generally constant over the recent past, averaging about five percent a year.

Demand

Since 1960, energy demand by electric utilities increased more than six-fold from 50.2 trillion Btus to 309.6 trillion Btus in 2000. Increases in demand have been recorded each year between 1995 and 1999, but demand declined by 2.7 percent in 2000.

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.

Energy Need

Nebraska utilities remain net exporters of electricity. Between 1995 and 2000, the amount of electricity exported has increased each year, reaching a peak of 7.2 billion kilowatthours in 1999. In 2000, utilities exported 4.7 billion kilowatthours, an estimated 16.2 percent of net generation that year.

Continued growth in need will result in additional capacity requirements. Several of the state's largest utilities have begun the 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.

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. In 2003, oil production declined to 2.755 million barrels from 2.779 million barrels in 2002. Since 1998, oil production has declined 13.3 percent. In 2000 (the latest year for consumption data), the state's crude oil production represented only 7 percent of the petroleum products used in the state in that year.

Natural gas has been produced in the state since 1950. Natural gas production peaked in 1960 and has declined precipitously since with a few infrequent increases in production, the last one occurring in 2003. In 2003, 1.47 billion cubic feet of natural gas was produced, an increase of 278 million cubic feet over natural gas production in 2002. In 2000, natural gas production represented only one 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.

During the reporting period, there were 12 operational wind turbines generating electricity: Springview, 2; Lincoln, 2; Valley, 1; and Kimball, 7. In 2003, more than 38.911 million kilowatthours — enough for 6,460 homes — were generated. Energy generated by the turbines is estimated to supply less than one percent of energy consumption in Nebraska, based on 2000 consumption data.

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.eere.energy.gov/state_energy/mystate.cfm?state=ne

In 2000, an estimated four percent of the state's total energy consumption was met from renewable resources. Total energy consumption in 2000 was 583.5 trillion Btus of which 22.47 trillion Btus came from renewable sources.

Assessments of the five feasible alternatives follow:

Biomass

In 2000, wood and waste provided an estimated 4.0 trillion Btus, less than one percent of the state's energy need. While ethanol remains the largest source of biomass energy production in Nebraska, a small but growing amount of electricity is being generated from methane at former landfills and at sewage facilities.

The most significant biomass energy resource in Nebraska continues to be ethanol that is produced from corn and grain sorghum. In 2000, an estimated 2.8 trillion Btus — almost 25 million gallons — of ethanol were consumed in Nebraska and represented about 0.5 percent of the state's total energy need.

In 2003, there were eight operating plants that produced an estimated 394.7 million gallons of ethanol, an increase of ten percent over the volume produced in 2002. By June 30, 2004, an additional seven plants met a minimum production of 8,500 gallons in 30 days to receive state incentives. After reaching this goal, six of the seven plants shut down production to build a larger facility or secure financing for expansion. Production at these plants is anticipated to resume in 12-18 months.

The state's ethanol board estimates that 25 percent of Nebraska's corn crop and the equivalent of three-quarters of the state's grain sorghum crop were used to produce ethanol in 2003. As production increases, these percentages will also increase.

Geothermal

There are two types of geothermal resources that can be utilized: hydro-

thermal fluid resources and earth energy. According to the Energy Information Administration, there are two pockets of high-temperature hydrothermal fluid resources in the north central and northern Panhandle portions of the state. This resource might be suitable for electricity generation, however, development appears unlikely in the foreseeable future.

Earth energy can be used directly to provide heat in a variety of applications, such as geothermal heat pumps 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.

In 2000, an estimated 0.32 trillion Btus were produced from geothermal resources in the state.

Hydropower

In 2000, 68 percent, 15.4 trillion Btus, of the renewable energy used in Nebraska came from hydropower sources. The electricity generated by the hydro resources came from 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 is relatively constant from year to year, unless affected by drought conditions. As the state's energy need continues to grow, less and less of the need will be met by hydro resources.

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 9 percent of the state's electricity needs in 1998. However, it is unlikely any additional hydropower resources in Nebraska 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 is limited to meeting the needs of cattle ranchers in remote regions where photovoltaic systems are less expensive than installing new power lines.

In 2000, an estimated 0.016 trillion Btus were generated from solar thermal and photovoltaic resources in the state.

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.

The outlook for an increase in wind generation capacity appears optimistic. During the reporting period, the board of Nebraska Public Power District agreed to build a wind turbine facility near Ainsworth. The planned 60 megawatt facility should become operational in the fall of 2005. The electricity produced from the project will meet the needs of about 19,000 households. About half of the output of the wind project will be utilized by other utilities including Omaha Public Power District and the Municipal Energy Agency of Nebraska.

Interest in residential scale wind turbines, capable of meeting the needs of a single household, is also rising. At least one planned residential-scale turbine owner plans on interconnecting to the grid to be able to sell excess power to the local utility.

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 a 19.2 percent reduction in energy use for 90 percent efficient furnaces.

Status of Ongoing Studies



The Nebraska Energy Office had no ongoing studies underway during this period.

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