NEBRASKA ENERGY OFFICE

2008 ANNUAL REPORT




E•N•E•R•G•Y
STATE OF NEBRASKA

www.neo.ne.gov

The vision of the Nebraska Energy Office is for Nebraskans to have reliable and affordable sources of energy that support a cleaner environment and a more secure energy future.

The mission of the Nebraska Energy Office is to promote the efficient, economic and environmentally responsible use of energy. The agency's principles are that we value teamwork, are customer oriented, and are committed to excellence, creativity and innovation.

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

- ❖ Maximize the efficient use of traditional energy resources.
- ❖ Encourage Nebraskans to adopt energy efficiency through low cost financing.
- ❖ Encourage the development and use of renewable energy resources.
- ❖ Advise the executive and legislative branches of state government on energy policy and security.

T H E P R O G R A M S

The Nebraska Energy Office operates several different federal and state programs. These programs are:

- ❖ Low-income Weatherization Assistance Program,
- ❖ State Energy Program and special projects,
- ❖ Oil overcharge-funded activities, primarily Dollar and Energy Saving Loans, and
- ❖ Statutorily-required state activities such as data collection and reporting.

Low Income Weatherization Assistance Program

The Energy Office administers the federally-funded program for weatherizing homes to save energy and money for those with limited incomes. The agency is responsible for inspecting the homes that are weatherized and for monitoring the sub-grantees, primarily community action agencies, that are responsible for the home weatherization improvements. Community action agency staff or private contractors are responsible for completing the work on the homes. The Energy Office staff inspects approximately 20 percent of the newly weatherized homes to ensure the quality of work performed.

This program received funding from two sources: $2,371,635 from the U.S. Department of Energy's Low Income Weatherization Assistance Program and $2,516,914 from the Low-Income Home Energy Assistance Program — a total of $4,888,549. Annually, the Nebraska Department of Health and Human Services transfers a portion of the funds received to pay utility bills to the agency to weatherize homes so that the need for utility bill paying assistance is reduced or eliminated.

In 2007-2008, 1,125 homes were weatherized with the federal funds; 811 frame homes, 144 mobile homes and 170

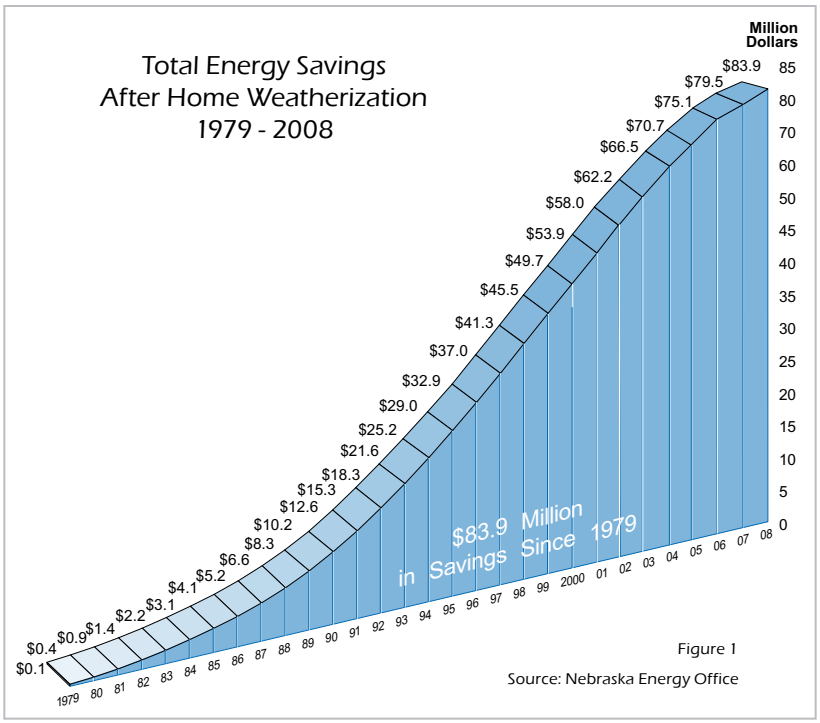


Figure 1

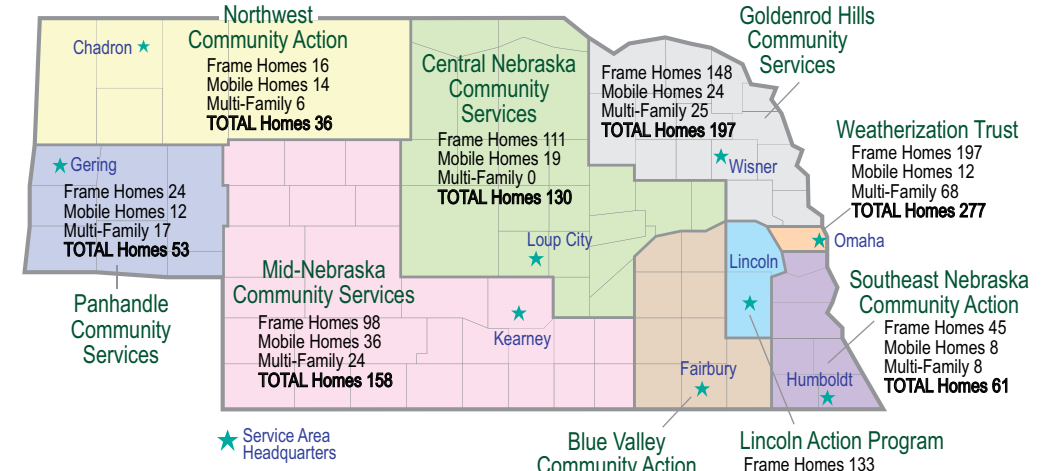
Source: Nebraska Energy Office

LOW INCOME WEATHERIZATION ASSISTANCE

"Conservatively, estimated savings for the 27 years total $83.9 million. About $4.4 million in new savings accrue annually because of the improvements made."

The Nebraska Energy Office provides administrative oversight and training for weatherization providers across the state. Home weatherization improvements save homeowners energy costs for up to 20 years.

Total Nebraska Homes Weatherized by Type and by Area Provider
July 2007 - June 2008



TOTAL 1,125 Homes Weatherized

Note: Multi-Family includes shelters and other units such as four plexes which are reported as single family rentals.

Figure 2
Source: Nebraska Energy Office

multi-family homes which includes three and four-plexes. The types of improvements made vary based on an analysis of the home and averages between $2,966 and $3,600 per home, excluding the cost of health and safety improvements such as a furnace replacement. The kinds of improvements made to homes vary by the home type: frame, mobile or multi-family. In a frame home, the top five improvements made were: adding insulation to attics (80%) insulating box sill areas and crawl spaces (49%), adding wall insulation (30%), replacing the furnace (30%) and replacing a primary door (23%). In mobile homes, the top five most frequent improvements were: replacing a primary door (66%), replacing a primary window (51%), insulating the underbelly (39%), replacing the furnace (31%) and adding insulation to the ceiling (29%). In multi-family homes, the three most common improvements were: adding insulation to the attic (82%), replacing a primary window (6%) and insulating box sills and crawl spaces (4%). Most homes that are weatherized also receive low-cost improvements such as caulking, weatherstripping, pipe wrap and water heater jackets.

Since the Weatherization Assistance Program began in 1979, $109.47 million has been spent to make energy efficiency improvements in 61,085 homes. An estimated 50,000 homes in Nebraska remain eligible for free weatherization services.

Energy savings resulting from the energy efficiency improvements made typically last 20 years or longer. The cumulative savings since 1979 are illustrated in Figure 1. Conservatively, estimated savings for the 27 years total $83.9 million. About $4.4 million in new savings accrue annually because of the improvements made. Recent studies of Weatherization Assistance Program savings in several states have indicated a higher rate — nearly 25 percent — than studies performed earlier.

Oil Overcharge Funds

Since 1982, Nebraska has received oil overcharge — or petroleum violation escrow — funds as a result of several court actions against oil companies that overcharged their customers during the period of federal price controls form 1973 to 1981. Since direct restitution to injured consumers was not practical, the courts ordered the money be distributed to the states and used, within parameters established by the courts and federal regulator, to fund energy assistance and efficiency programs. The final petroleum violation escrow payment from the U.S. Department of Energy was received September 7, 2007.

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

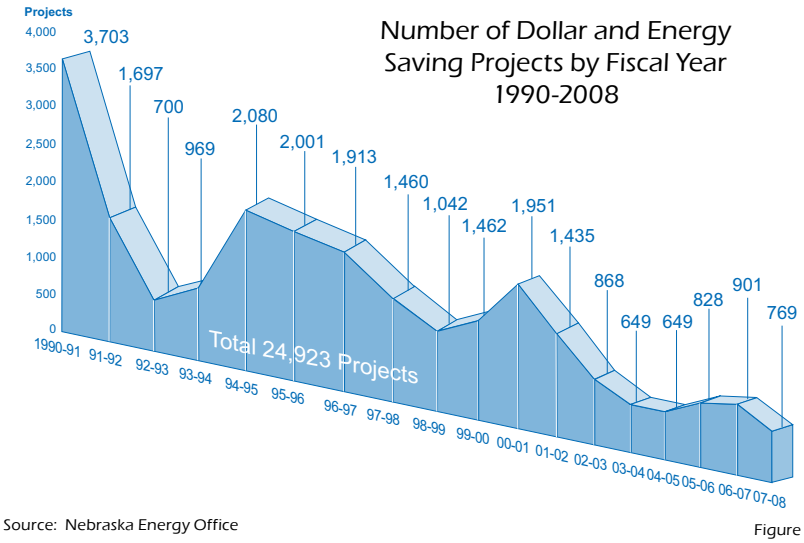
Nebraska Energy Settlement Fund
A Summary of Exxon, Stripper Well and Diamond Shamrock
Oil Overcharge Funds as of June 30, 2008

	Exxon	Stripper Well	Diamond Shamrock	Total
Funds Received	$15,504,944	$15,674,042	$359,172	$31,538,158
Interest Earned and Miscellaneous Income	$11,100,941	$8,721,854	$248,075	$20,070,870
Total	$26,605,885	$24,395,896	$607,247	$51,609,028
Funds Budgeted	$26,605,885	$24,030,522	$607,247	$51,243,654
Low Income Designated	$0	$135,748	$0	$135,748
Uncommitted Balance	$0	$229,626	$0	$229,626

Source: Nebraska Energy Office

Figure 3

"Since direct restitution to injured consumers was not practical, the courts ordered the money be distributed to the states and used, within parameters established by the courts and federal regulator, to fund energy assistance and efficiency programs."



Number of Dollar and Energy Saving Projects by Fiscal Year 1990-2008

Source: Nebraska Energy Office

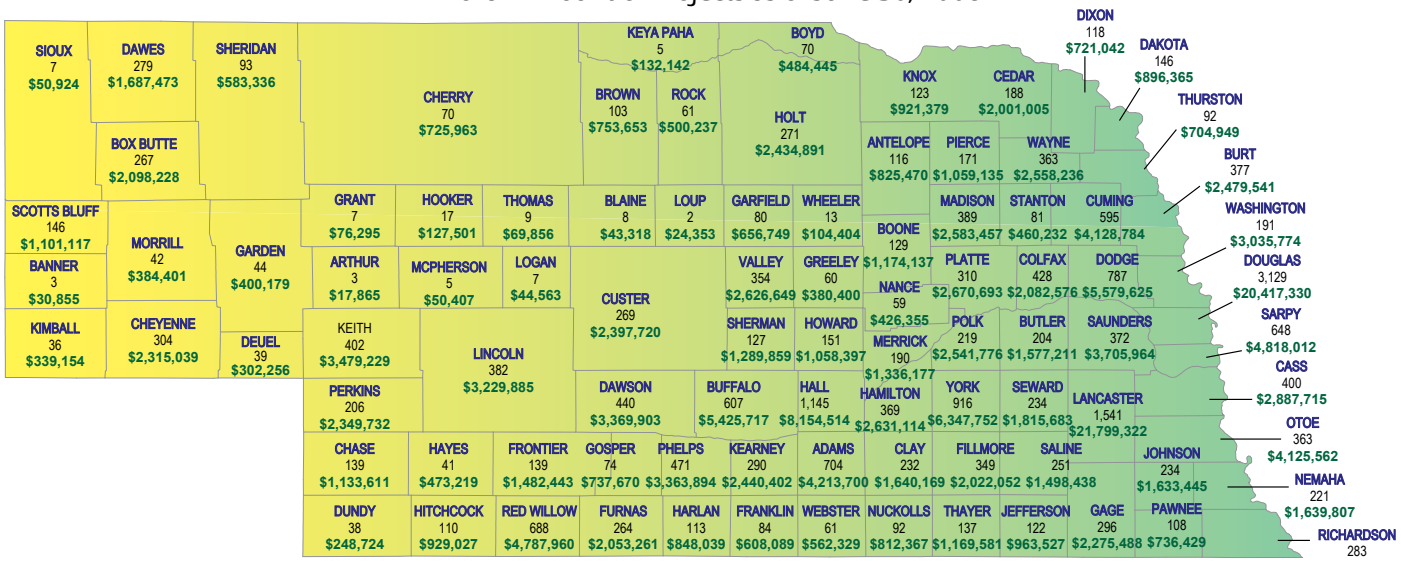
Figure 4

Dollar and Energy Saving Loans

The Dollar and Energy Saving Loan program was capitalized with oil overcharge funds and is re-charged with loan repayments from borrowers. The low-interest loans are provided to Nebraskans to finance home, building, transportation and system improvements that

O I L O V E R C H A R G E F U N D S

Dollar and Energy Saving Loan Projects,
Number of Projects by County and Total
Dollar Amount of Projects as of June 30, 2008



Source: Nebraska Energy Office

Figure 5

reduce energy use. Nebraskans apply for Dollar and Energy Saving Loans through their local lenders. Presently, there are 400 Nebraska bank, savings and loan and credit union locations that provide 5 percent or less interest rate financing for up to ten years on loans for energy efficiency improvements and waste minimization projects.

From 1990 to June 30, 2008, 24,923 projects totaling more than $215.4 million have been financed with low-interest loans from the Energy Office and participating lenders and funds from borrowers for non-eligible improvements. More than $92.91 million of the 215.4 million has come from the agency's revolving loan fund. The state's participating lenders provided more than $96.23 million. The balance, more than $26.24 million, was spent by the borrowers on non-eligible related improvements.

Loans have financed projects in all of the state's 93 counties as illustrated in Figure 5. Douglas County with 3,129 projects totaling $20.4 million tops the list. The fewest loans — two — have been made in Loup County and total only $24,353.

During this reporting period, 769 new projects were financed. The number of energy efficiency projects financed since 1990 are shown in Figure 4.

For reporting purposes, the loans are categorized into 11 different areas. More than 94.5 percent of the loan funds — from the agency and the participating lenders — have financed improvements in just four areas: residential, energy efficient housing, business and agriculture. The number of projects by area and the total amount of the loans in each area appear in Figure 6. Several of the largest categories are detailed as follows:

OIL OVERCHARGE FUNDS

Residential

Nearly 93 percent of the total number of energy efficiency projects financed by the agency is in the homes of Nebraskans. More than 69 percent of funds from all sources — $149.25 million — has been used to finance residential energy saving improvements such as replacement of inefficient furnaces, air conditioners and heat pumps, replacement of windows and doors and insulation of walls and ceilings. Since 1990, 23,132 residential energy efficiency projects have been undertaken by Nebraskans.

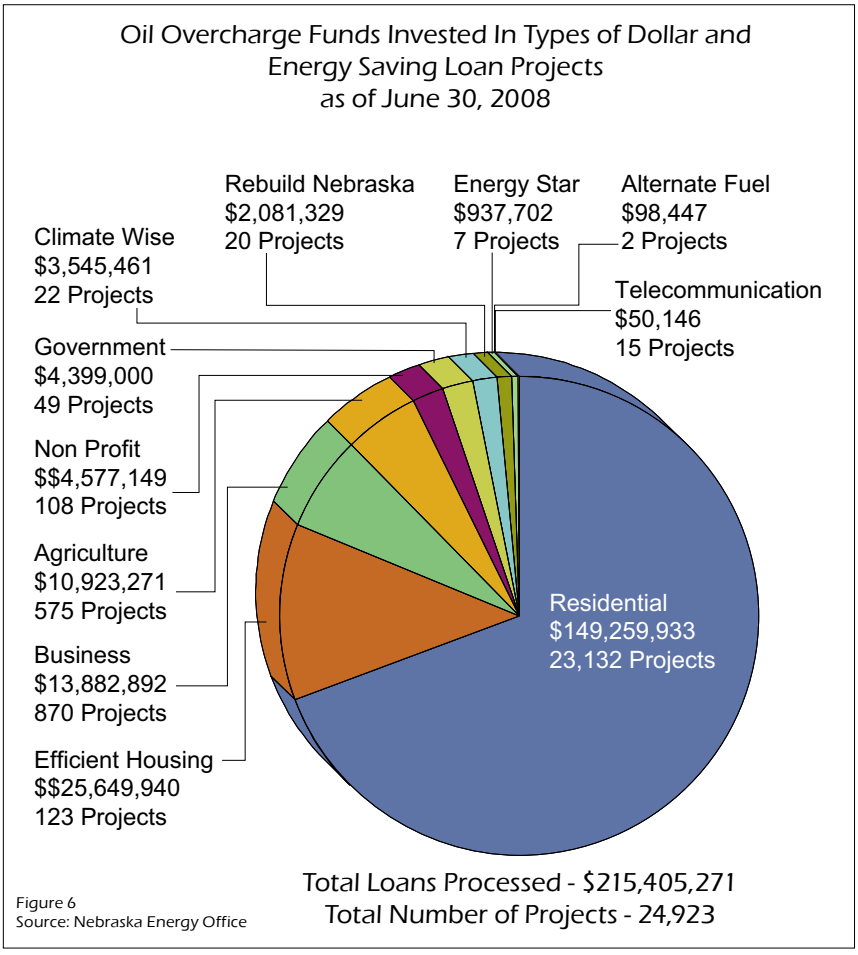


Figure 6
Source: Nebraska Energy Office

Business

More than 6.4 percent of funds from all sources — $13.88 million — has been used to make building and system improvements in 870 projects since 1990, ranking second-highest among all active loan areas. Typical business improvements include replacement of heating and cooling equipment as well as installation of insulation and replacement of doors and windows.

Agriculture

Improvements in agricultural equipment and systems rank fourth in the use of low-interest financing. Just over 5 percent of all improvement funding — $10.932 million — has been used to finance projects such as low-pressure irrigation systems, replacement of irrigation pumps and motors, replacement of grain dryers and well modifications. Since 1990, 575 projects — 2.30 percent of all projects — have been financed with $5.37 million from the Energy Office, $5.24 million from participating lenders and $308,828 from borrowers.

State Energy Program

In 2007-2008, Nebraska received $446,000 for this federally-funded effort and supplied $89,200 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 http://www.neo.ne.gov/statshtml/index3c.html and web site http://www.neo.ne.gov/

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, support of renewable energy

activities and residential and commercial building energy efficiency. The agency also manages competitive federally-funded State Energy Program Special Project grants secured by the agency.

The Energy Office reviews state-financed plans for affordable homes assuring compliance with the Nebraska Energy Code. Periodically, the agency performs on-site inspections of completed homes, sharing compliance findings with the funding source.

For homes being constructed as Nebraska Certified Green Built, the agency conducts inspections throughout construction. The Energy Office owns the service mark for Nebraska Certified Green Built and offers metal plaques for homes built to established standards. The agency also provides technical assistance, builder training and certifies housing plans. Information about green built homes is at http://www.neo.ne.gov/home_const/greenbuilthomes.htm

"The Energy Office owns the service mark for Nebraska Certified Green Built and offers metal plaques for homes built to established standards. The agency also provides technical assistance, builder training and certifies housing plans."

Efficient housing project in Chadron, Nebraska

A number of activities are grouped under the State Energy Program (SEP), because the federal funds come through SEP. The activities that occurred under each special project grant during the reporting period is documented in this section.

Advanced Training Equips Building Officials to Enforce the New Nebraska Energy Code

The Special Project Codes and Standards grant of $24,725 was received from the U.S. Department of Energy and enabled the Energy Office to enhance and expand the knowledge base and capabilities of local code officials, inspectors and designers through advanced energy code training. The grant enabled the Energy Office to provide two training workshops to 76 persons involved in Nebraska's construction industry, and to pay for certification examinations for 75 local code officials and other members of Nebraska's construction industry. The training took place in March of 2007, while the three certification examinations were offered in April and May of 2007. A total of 44 Nebraskans were certified as Residential Energy Inspector/Plans Examiners, Commercial Energy Plans Examiners or Commercial Energy Inspectors. This project was completed September 2007.

Develop and Implement Industrial Technologies Programs in Large Energy Consumption Industrial Plants

The Energy Office received a $100,000 Industries of the Future grant from the U.S. Department of Energy in October of 2005 to develop and demonstrate advanced Industrial Technologies Programs using two case studies and to initiate a statewide effort in Nebraska's industrial sector. Advanced Industrial Technologies Programs allow industry owners to implement major energy efficiency improvements with little or no capital investment. A total of 17 buildings were evaluated including food processing plants, data processing facilities and medical manufacturers and laboratories. Comprehensive energy case studies were conducted on six buildings. Advanced industrial technologies program improvements were implemented in three buildings. The detailed retrofit improvements, estimated energy savings and project cost were provided to building owners. The project was completed September 30, 2007.

National Renewable Energy Laboratory Wind Energy Contract

In September 2007, the Energy Office received a one year, $75,000 contract from the National Renewable Energy Laboratory under the Department of Energy's Wind Powering America program to perform a number of activities related to fostering wind energy development in the state. The tasks required under the contract included: convene a state wind conference every 12-18 months, provide information and outreach to consumers, develop and implement a strategic plan, form a state wind working group, and create an anemometer loan program.

Under this project, the Nebraska Farmers Union received $24,500 to provide wind energy outreach services including participation in the Nebraska State Fair and Husker Harvest Days and the Nebraska Farmers Union Federation received $10,500 to promote and plan the state's first Wind Energy Conference held in Kearney in November 2008. The agency also published and printed 2,000 copies of *Small Wind Electric Systems: A Nebraska Consumer's Handbook*.

The Energy Office has built a database of nearly 2,500 wind energy consumers, held a wind energy conference that was attended by 450 Nebraskans, not including presenters, and together with its contractor, provided more than 50 informational meetings across the state, including a week-long tour in February 2008. The agency's wind energy web site was visited by tens of thousands during the reporting period.

Nebraska Energy Plan Update

In October 2008, the Energy Office began a public participation process to update the state's 1991 Energy Plan. The initial phase of the process involved 9 comment sessions held across the state utilizing traditional public hearing processes as well as video conferencing. The agency also solicited comments on what should be in the plan via its web site, emails and letters. An estimated 300 individuals, companies and organizations submitted comments.

The second phase of the update process began in December with the release of an interim *2009 State Energy Plan* which is online at http://www.neo.ne.gov/comments2/PlanDraft2009.pdf . The agency again asked Nebraskans to share their comment on the plan using letters, emails and comments at the web site. Approximately 100 comments were received in January.

The 2009 Nebraska Energy Plan is expected to be completed in 2009. Possible legislative recommendations and statutory changes may result after the Plan is finalized.

Opportunities of Improving Industrial Environmental Control Systems Energy Performance in Nebraska

In September 2008, the Energy Office received $49,767 from the U.S. Department of Energy funding opportunity, *Save Energy Now: State Industrial Assessment Projects*, solicitation. The Nebraska proposal partnered the agency with the University of Nebraska-Lincoln and Omaha Public Power District.

This project will identify six industrial facilities in the state, collect data on their systems, fuel sources and energy consumption and conduct on-site measurements of their operations. An analysis will be performed on the environmental systems at each facility and an energy assessment report will be produced that identifies energy and operations improvement opportunities. Omaha Public Power District and the University of Nebraska-Lincoln received contracts under this proposal for $12,444 and $34,983, respectively. This project is scheduled for completion by the end of 2009.

STATE ENERGY PROGRAM

Rebuild Nebraska Partners Identify and Implement High Performance Building Strategies

The Energy Office received a $100,000 Rebuild America grant from the U.S. Department of Energy in October of 2005 to continue Rebuild Nebraska work and boost the implementation of Continuous Commissioning technologies in commercial buildings, university buildings, K-12 schools and state and local government buildings. A total of 51 building owners were recruited to participate in this project and 37 buildings were evaluated. Dedicated energy meters were installed on 15 candidate buildings and continuous commissioning technologies were implemented in a total of 26 buildings. The project was completed September 30, 2007.

State Heating Oil and Propane Program

During the reporting period, the Energy Office began its seventh 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 Administration and then posted on the agency's web site at http://www.neo.ne.gov/statshtml/86.html and http://www.neo.ne.gov/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.

Other Projects

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

Biopower Steering Committee

Authorized by the Legislature through December 31, 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.

Financial Activity

In 2007-2008, the expenditures for the Nebraska Energy Office totaled $9,931,841 which includes monies from federal, state and oil overcharge trust funding sources. Funding declined

Where the Money Came From
as of June 30, 2008

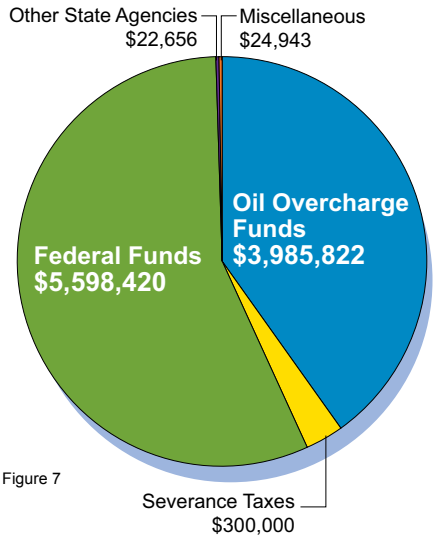


Figure 7

Total $9,931,841

F I N A N C I A L A C T I V I T Y

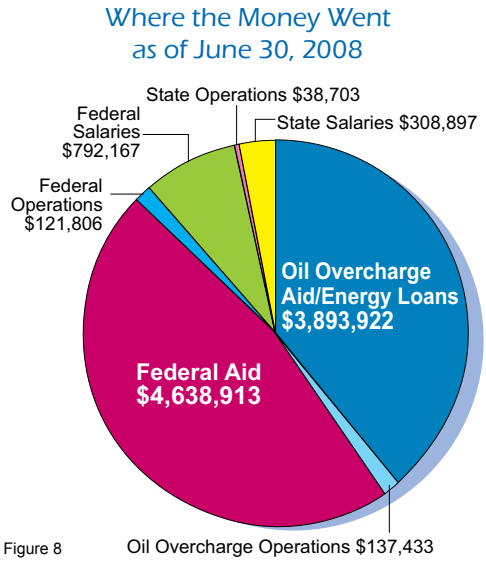


Figure 8

by $1.71 million from the previous fiscal year, primarily because of a reduction in federal funding.

The sources of funding for the agency are illustrated in Figure 7. More than 56 percent of the funds came from federal resources such as Low-Income Weatherization Assistance Program, Low-Income Home Energy Assistance Program and the State Energy Program. About 40 percent of the funding for the agency was provided from oil overcharge trust accounts, specifically funds used for financing Dollar and Energy Saving Loans.

More than 46 percent of all agency funds were spent as federal aid under the Low-Income Weatherization Assistance Program. More than 39 percent of the agency funds were expended for Dollar and Energy Saving Loans to Nebraskans. Oil overcharge fund activity during the reporting period is located on page 3 of this report. A more complete listing of expenditures by category is illustrated in Figure 8.

(1) In February 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 statewide 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, 81-161, 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 tracks 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 the *Annual Report*. Detailed energy data required by statute to be maintained by the Energy Office can be found on the agency's web site at: http://www.neo.ne.gov/statshtml/index3c.html

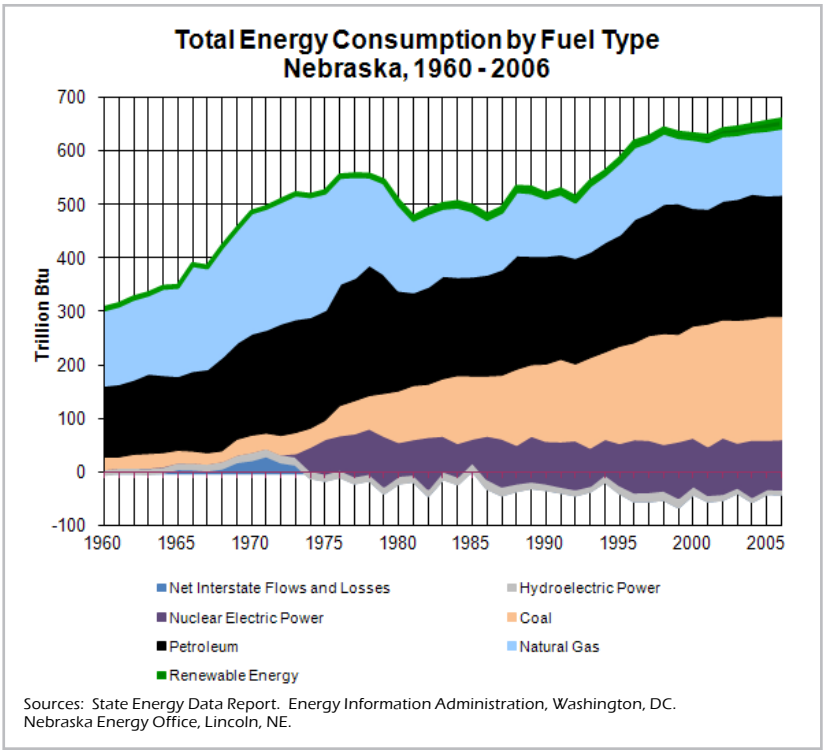
STATE-WIDE ENERGY NEED AND COST

Need

2006. Nebraska's total energy consumption was 659.3 trillion British thermal units (Btus), an increase of 4.4 trillion Btus — less than one percent — over 2005 and the highest since recordkeeping began in 1960. A British thermal unit is a standard measure of heat energy. It takes one Btu to raise the temperature of one pound of water by one degree Fahrenheit at sea level. The use of coal and biomass declined while natural gas, petroleum, nuclear and hydro increased. Among all the states, Nebraska ranked 39th in total energy consumption.

1960-2006. Energy use over the past 46 years has changed markedly. Overall, consumption has more than doubled from 308.3 trillion Btus in 1960 to 659.3 trillion Btus in 2006.

- Coal use has increased more than tenfold from 20 trillion Btus to 227.4 trillion Btus between 1960 and 2006. Peak use of coal was reached in 2005. Virtually all of this growth is attributable to coal used to generate electricity.
- Natural gas consumption has declined during the 46 years from 140.4 trillion Btus to 123.3 trillion Btus. Natural gas consumption peaked in 1970. The modest decline in consumption of natural gas is a result of increased equipment efficiency and fewer homes using natural gas as a primary heating source.
- Use of refined petroleum products nearly doubled over the past 46



Sources: State Energy Data Report. Energy Information Administration, Washington, DC. Nebraska Energy Office, Lincoln, NE.

years from 136.5 trillion Btus in 1960 to 232.5 trillion Btus in 2006. Gasoline and distillate fuel oil — primarily diesel fuel — comprise the bulk of refined petroleum products consumed. Both types increased between 1946 and 2006. Diesel fuel consumption nearly quadrupled from 24.2 trillion Btus in 1960 to 96.3 trillion Btus in 2006. This increase is attributable to increased trucking and agricultural use. Gasoline consumption only increased by a quarter during the period from 78.8 trillion Btus to 105.2 trillion Btus. Changes in gasoline consumption can be traced to increased fuel efficiency of vehicles, stable population growth and a steady growth in miles traveled annually. Petroleum consumption peaked in 1999 at 248.2 trillion Btus.

- Nuclear power was not generated in the state until the early 1970s. Nuclear consumption has increased by about half over the period, rising from 65.2 trillion Btus in 1975 to 93.9 trillion Btus in 2006. Nuclear consumption peaked in 2003 at 106.8 trillion Btus.
- Hydroelectric consumption from 1960 to 2006 declined from 10.3 trillion Btus to 8.9 trillion Btus. Hydro production peaked in 1999 at 17.6 trillion Btus. Fluctuations in hydro consumption are generally attributed to drought conditions which result in reduced hydropower production.

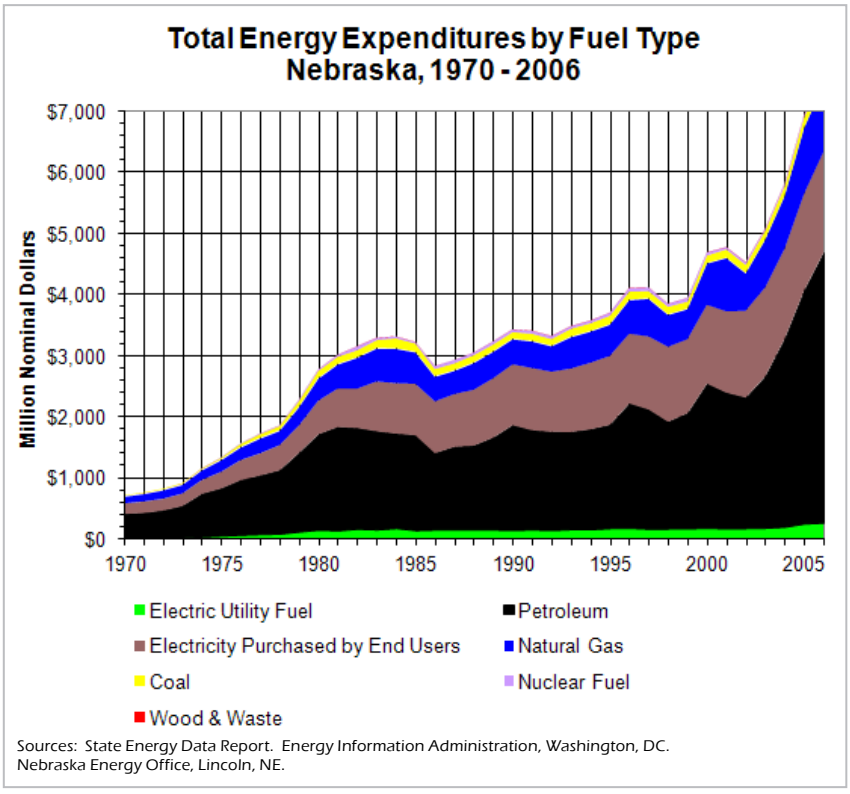
"Among the states, Nebraska ranked 38th in energy expenditures in 2006. Expenditures in 2006 for petroleum products accounted for about 61 percent of the total, retail electricity, 23 percent and natural gas, 15 percent."

Oil drilling in Cheyenne County, Nebraska

Cost

2006. Nebraska's total energy expenditure increased 10 percent to $7.133 billion, an increase of $713 million over 2005. Refined petroleum products — primarily gasoline — accounted for $600 million of the increase. Among the states, Nebraska ranked 38th in energy expenditures in 2006. Expenditures in 2006 for petroleum products accounted for about 61 percent of the total, retail electricity, 23 percent and natural gas, 15 percent.

2006 prices for different types of energy, as compared to the other 49 states, shows that Nebraskans paid the lowest price for coal in the nation. At the other extreme, Nebraskans paid the 14th highest price for petroleum. Prices for natural gas in Nebraska ranked 33rd when compared to other states. Electricity prices in the state were the fifth lowest, ranking 46th. On a per capita basis, Nebraska ranked 20th in energy expenditures among the states at $4,044. Alaska ranked first with a per capita expenditure of $9, 080. Arizona



Sources: State Energy Data Report. Energy Information Administration, Washington, DC. Nebraska Energy Office, Lincoln, NE.

ranked last with a per capita energy expenditure of $3,073. The United States' average of energy expenditures per capita was $3,876.

1970-2006. Total energy expenditures in 1970 were $666.9 million and had more increased by more than ten-fold 36 years later in 2006 to $7.133 billion. The peak in expenditures by fuel type was reached in 2006 for all types listed below, except nuclear which was $63.4 million in 1996. Nebraskans spent nearly seven times the amount on energy in 2005 as was spent in 1970. However, the percentage share of personal income has not varied as much: In 1970, 11.8 percent was spent on energy and in 2005, 11.1 percent was spent on energy. The peak percentage occurred in 1980 at 17.0 percent.

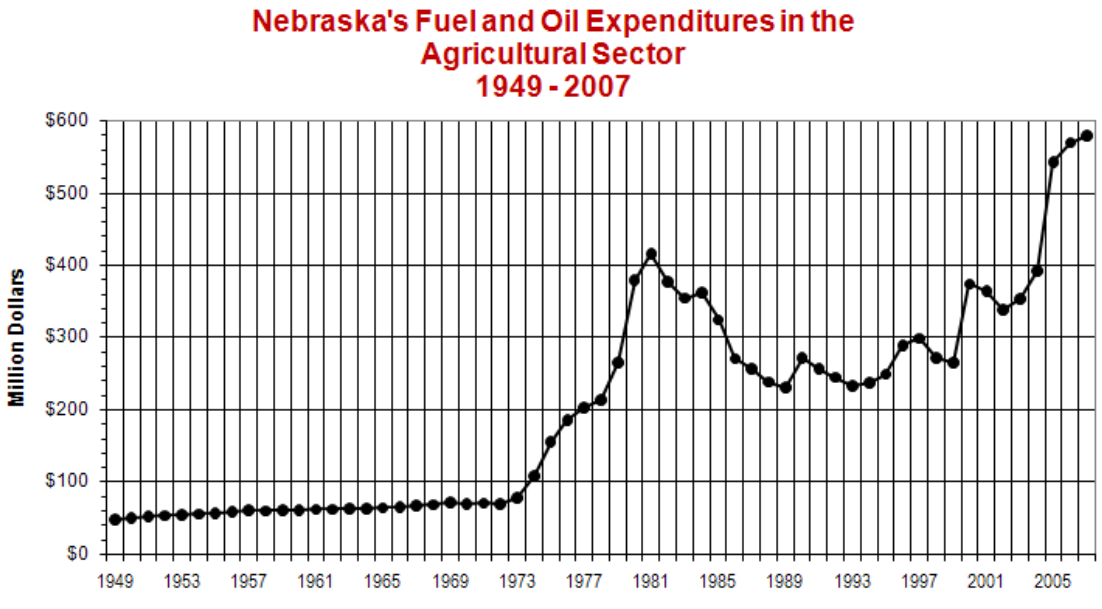
Coal expenditures increased from $9.8 million in 1970 to $191.5 million in 2006.

- Natural gas expenditures increased more than ten-fold from $104.1 million in 1970 to $1.1 billion in 2006.
- Petroleum expenditures also increased more than ten-fold from $404.8 million in 1970 to $4.412 billion in 2006.
- Nuclear expenditures soared from $1.1 million in 1973 — the first partial year of operation of one of the state's two nuclear plants — to $44.4 million in 2006.
- Electricity purchased by end users totaled $170.3 million in 1970 and rose to $1.655 billion in 2006.

"Nebraskans paid the 14th highest price for petroleum. Prices for natural gas in Nebraska ranked 33rd when compared to other states."

Agricultural

According to the National Agricultural Statistics Service, there were 47,300 farms and ranches on 45.6 million acres in Nebraska in 2007, encompassing about 93 percent of the state's total land area. The average operation contains 964 acres. In 2002, 8.1 million acres were irrigated. Agricultural energy data is aggregated with other data in the Industrial sector. As such, separate agricultural energy data is not always available on a consistent or annual basis.



Sources: United States Department of Agriculture.
Nebraska Energy Office, Lincoln, NE.

Energy Supply

Energy supplies for the state's agricultural sector have been met. Over the years, any energy supply problems have been limited to infrequent shortfalls of petroleum products or fertilizer — reliant on energy inputs — usually during periods of peak demand or energy shortfalls because of worldwide demand.

Demand

As indicated earlier in this section, energy demand information for the agricultural sector is not available on a consistent or annual basis. One of the primary tracking

A G R I C U L T U R A L

"The Energy Office provides low-cost financing for irrigation efficiency projects such as low-pressure pivots and replacement pumps and motors."

Low pressure center pivot irrigation system. (Photo courtesy, University of Nebraska.)

tools, the Census of Agriculture, is only conducted every five years. National energy databases commingle agricultural demand with data from the industrial sector.

Conservation

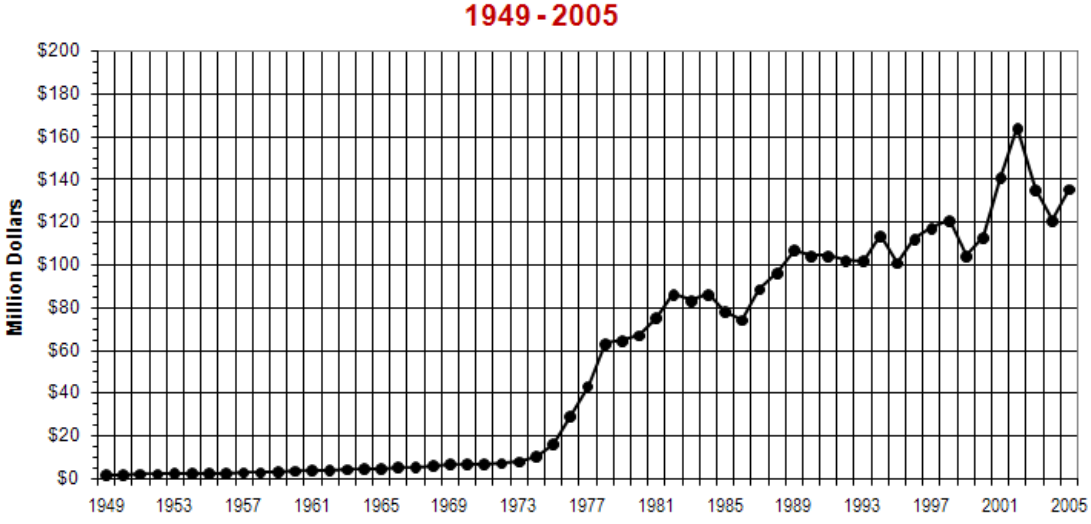
As with most consumer behavior, high fuel costs or limited availability of energy resources induces demand for efficiency practices in this sector. For example, record high prices for natural gas have caused farmers to alter practices such as when and how much anhydrous ammonia fertilizer — a natural gas product — is used. High diesel prices have motivated farmers to adopt conservation tillage practices, resulting in reduced cultivation on crop land, and to switch from using diesel to power irrigation systems.

As energy costs have increased, the state's agricultural producers — with assistance from the agricultural extension agents and research as well as others — have adopted a variety of practices that have reduced energy use: conservation tillage, irrigation pump efficiency testing, irrigation scheduling and load management practices. For example, 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. Low-interest loans have also been used to finance grain dryers, no-till equipment, dairy vacuum pumps and similar equipment. Over the past several years, U.S. Department of Agriculture 9006 grants have partially financed hundreds of irrigation efficiency improvements that also included switching fuel sources from diesel and natural gas to electricity. As long as federal funding remains available and diesel prices remain high, this trend in irrigation is likely to continue.

Energy Need

Energy need in the ag sector can be influenced by the cost of inputs such as energy, which are a significant factor in modern farming. Over the decades as farms have increased in size, energy has replaced labor, allowing fewer people to produce larger harvests of agricultural goods. Another long-term trend has been the increase in irrigation. In 1966, 3.1 million acres were irrigated and by 2002, 8.1 million acres were under irrigation. In 2003, 16,104 farms used irrigation. The fuel used to power the pumps in 2003 was diverse: electricity, 45 percent; diesel, 27 percent; natural gas, 16 percent; propane, 12 percent and gasoline/ethanol, less than 1 percent. More recent figures would likely show declines in diesel, natural gas and propane and an increase in electricity.

In 2006, the latest information available, direct energy expenditures in agriculture accounted for between five to seven percent of farm expendi-



Sources: United States Department of Agriculture.
Nebraska Energy Office, Lincoln, NE.

AGRICULTURAL

tures. That year, the ag sector's energy consumption was: diesel, more than 50 percent; gasoline, 16 percent; electricity, 13 percent; natural gas, 9 percent; propane, 9 percent; and other fuels 2 percent. Indirect energy consumption from fertilizers and pesticides accounted for 9-10 percent of farm expenditures. According to the U.S. Department of Agriculture, Nebraska farm expenditures in 2007 totaled $460 million for agricultural chemicals, $900 million for fertilizer, lime and soil conditioners and $580 million for fuel.

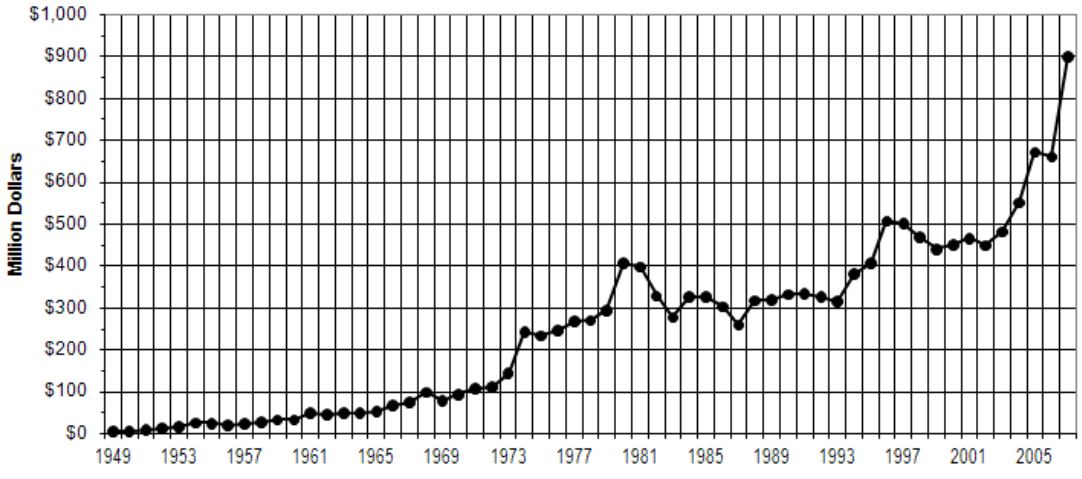
Since 1949, Nebraska's fuel and oil, electricity and fertilizer expenditures by the agricultural sector have been tracked. Between 1949 and 1973-1974, prices were stable and showed mostly marginal increases over time. However, after the impact of the first oil price shock in the early 1970s, ag energy expenditures deviated markedly from historic patterns, becoming far more erratic and costlier. Fertilizer expenditures in the state have shown the most substantial change between 1949 and 2007, rising from $2.1 million to $900 million. Between 2006 and 2007, expenditures for fertilizer rose by more than a third, from $660 million to $900 million. Fuel and oil expenditures have also shown a dramatic increase, peaking in 2007. In 1949, fuel and oil expenditures totaled $47.5 million. By 2007, those expenditures had risen to $580 million. Electricity expenditures in the state peaked in 2002 at $164.1 million. In 1949, electricity expenditures only totaled $1.6 million. By 2005, electricity expenditures were $135.4 million. Two widely used fuels in the ag sector, propane and diesel, have increased markedly. Bulk delivery price for propane in the Northern Plains rose from 47 cents a gallon in 1990 to $1.97 a gallon in 2008. Bulk delivery price of diesel fuel in the Northern Plains rose from 78 cents a gallon in 1990 to $3.54 a gallon in 2008.

The energy needs of the state's agricultural producers can fluctuate substantially from one growing season to another. For example in 2001, a 30 percent increase in petroleum use was primarily due to increased irrigation use because of drought conditions in parts of the state.

Fuel substitution, or conversion to other types of fuel, is very difficult for this sector to utilize without costly changes in equipment.

" Between 2006 and 2007, expenditures for fertilizer rose by more than a third, from $660 million to $900 million. "

Applying fertilizer near Wallace, Nebraska



Sources: United States Department of Agriculture.
Nebraska Energy Office, Lincoln, NE.

Commercial

The commercial sector, which includes non-manufacturing business establishments, closely parallels consumer energy use and economic activity in the state. Energy use by local, state and federal governments is also included in this sector.

Energy Supply

2006. In 2006, more than 93 percent of the energy used in the commercial sector came from only two sources: natural gas and electricity, after accounting for electric system energy losses. Sup-

C O M M E R C I A L

plies of both energy resources have been sufficient with only brief periods of supply tightness, primarily due to weather or damaged transmission lines.

1960-2006. Supply trends over time indicate a continued dominance of these two fuel sources in this energy use sector.

Demand

2006. Just 19.6 percent — 129.7 trillion British thermal units — of the state's total energy demand was consumed by the commercial sector in 2006. The increase in demand from 2005 to 2006 was 1.9 trillion British thermal units, the largest increase in four years.

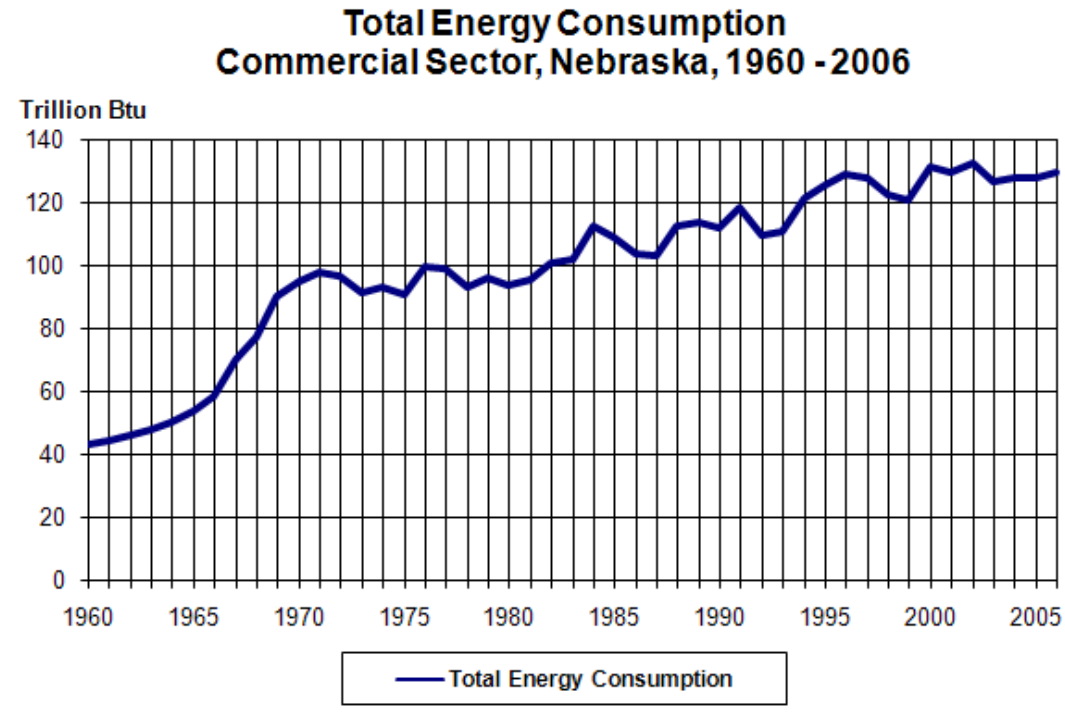
1960-2006. When data collection began in 1960, the commercial sector demand was 42.8 trillion British thermal units, less than one-third of the amount of energy used in 2006. The peak year of demand in this sector, 2002, 132.8 trillion British thermal units of energy were used. Since 2003, annual demand increases have ranged from slightly less than one trillion British thermal unit to nearly two trillion British thermal units.

Conservation

Changes or reductions in energy use in the commercial sector closely parallel those patterns found in the residential sector. Efforts to conserve energy use tend to be economically driven, especially when fuel prices rise above historic levels. Reduced energy use often results from economic downturns in the larger economy. For example, energy use in this sector declined by almost 10

"Changes or reductions in energy use in the commercial sector closely parallel those patterns found in the residential sector. Efforts to conserve energy use tend to be economically driven, especially when fuel prices rise above historic levels."

Historic Commercial District, Fremont, Nebraska



Sources: State Energy Data Report. Energy Information Administration, Washington, DC.
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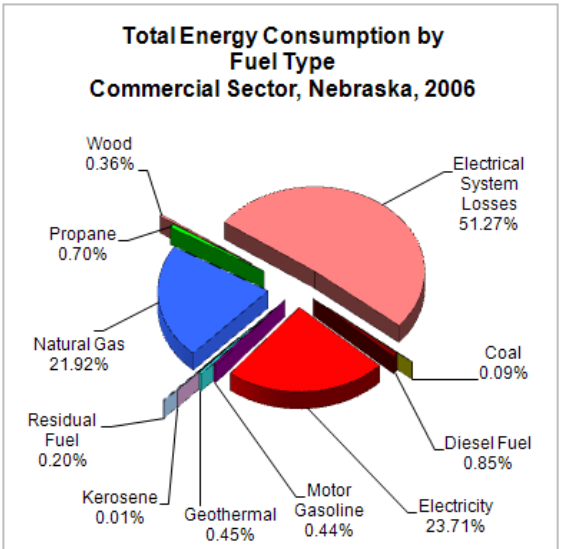
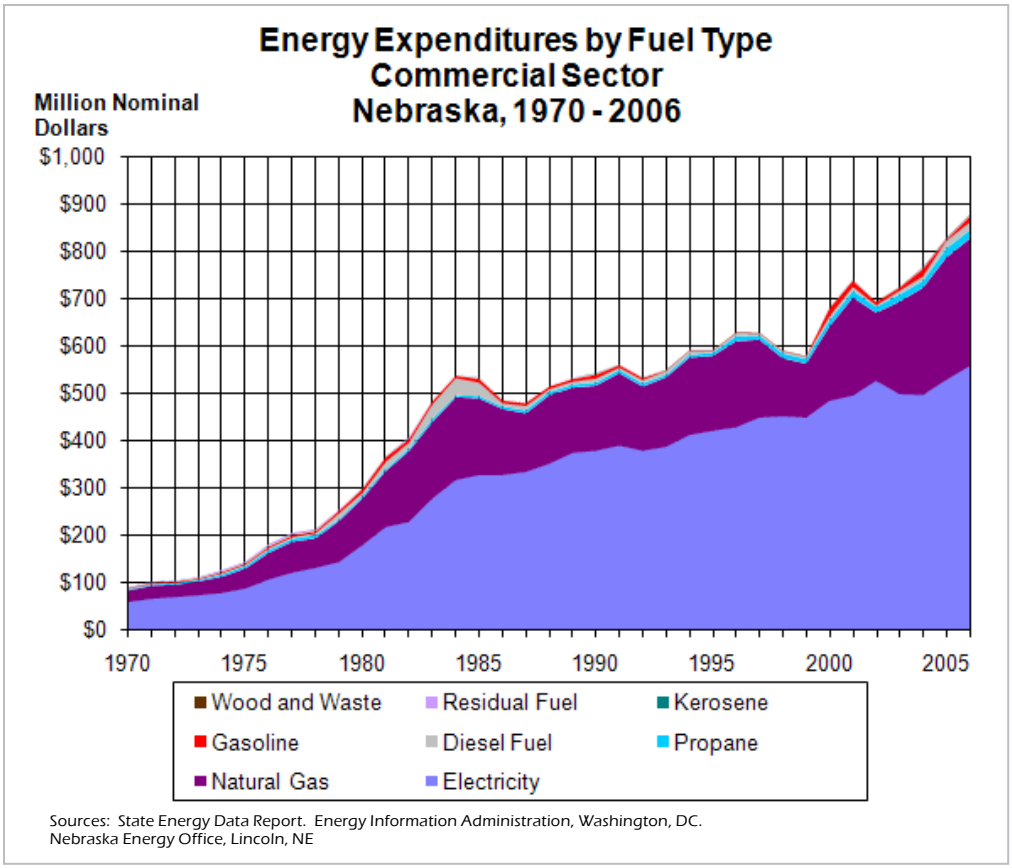


Sources: State Energy Data Report. Energy Information Administration, Washington, DC. Nebraska Energy Office, Lincoln, NE.



Sources: State Energy Data Report. Energy Information Administration, Washington, DC. Nebraska Energy Office, Lincoln, NE

trillion British thermal units from 1991-1992, which paralleled a national recession. The economic decline in late 2008 and 2009 are likely to show a similar decline in energy use in this sector.

Energy Need

Since the primary needs of the commercial sector are confined to readily available supplies of natural gas and electricity, no issues relating to energy need are foreseen since supplies of both fuel types are ample.

2006. Energy prices for the two primary fuel sources — natural gas and electricity — rose in 2006. Natural gas increased from $9.35 (measured in nominal dollars per million British thermal units) in 2005 to $9.49 in 2006. For electricity the increase was greater, rising from $17.52 (measured in nominal dollars per million British thermal units) in 2005 to $18.15. The annual average increased from $13.62 (measured in nominal dollars per million British thermal units) in 2005 to $14.08 in 2006.

1970-2006. One factor of need is price. A commercial business' need of energy can differ markedly if the price of energy doubles in a short period of time. Expenditures in the commercial sector have changed markedly over the 36-year period. In 1970, the commercial sector's energy expenditures totaled $89.9 million (in nominal dollars). The peak year for expenditures in this sector occurred in 2006 at $877.7 million (in nominal dollars), almost a ten-fold increase over the 36 years.

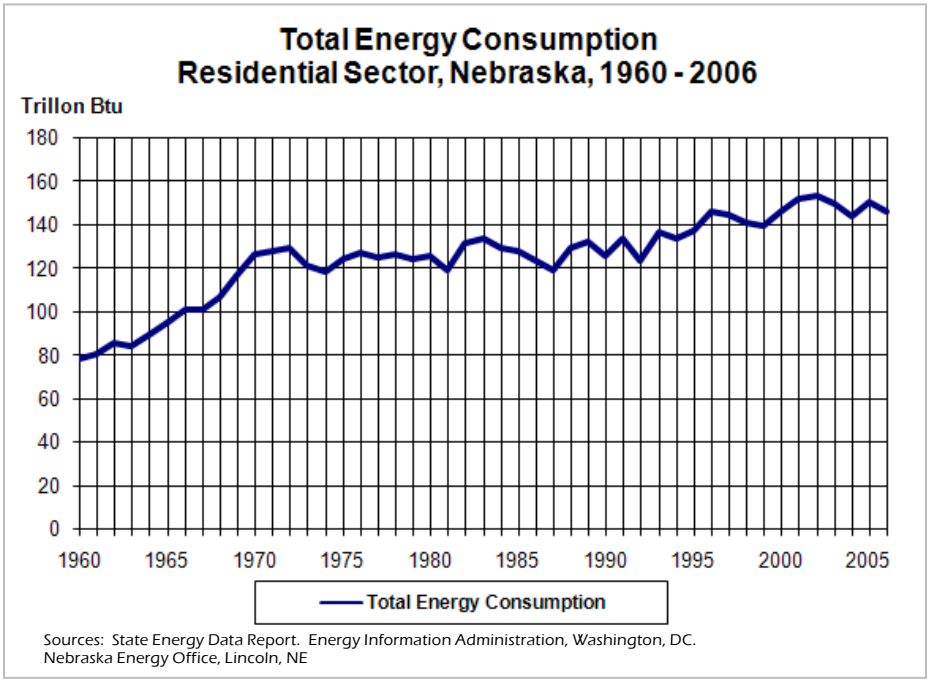
Residential

Energy Supply

2006. More than 88 percent of the energy used in the residential sector in 2006 came from only two

R E S I D E N T I A L

sources: natural gas and electricity. Nearly half the energy used in this sector comes from natural gas. Natural gas is used primarily for home heating and minor household uses such as water heating, clothes drying and cooking. Electricity is used throughout the home for heating, cooling, water heating, appliances, lighting and miscellaneous activities and equipment. Supplies of both natural gas and electricity are readily available.



Sources: State Energy Data Report. Energy Information Administration, Washington, DC.
Nebraska Energy Office, Lincoln, NE

"Higher than normal heating bills have propelled homeowners to make energy saving improvements such as replacing aged furnaces with new efficient models, adding insulation and replacing windows and doors with more energy efficient ones."


Omaha, Nebraska Residence

1960-2006. Supply trends and fuel types used in the residential sector have not changed substantially over 36 years with the exception of a slow decline in natural gas and an equally slow rise in electricity use.

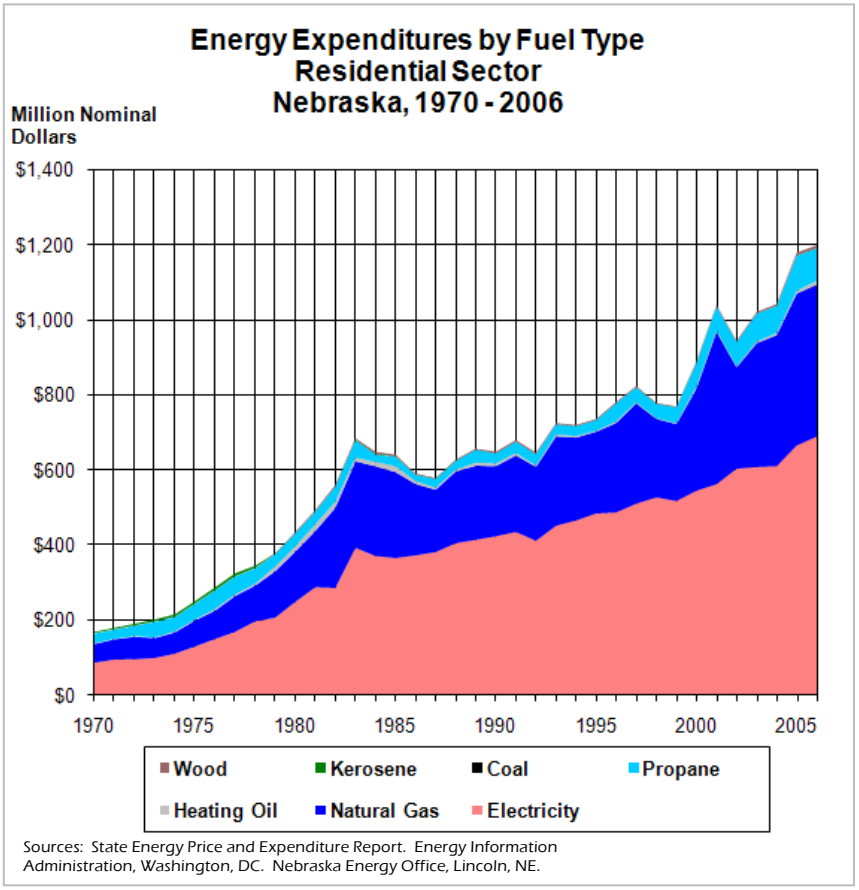
Demand

2006. Exactly 22 percent — 145.6 trillion British thermal units — of the state's total energy demand was consumed in the residential sector in 2006. The decline in demand from 2005 to 2006 was 4.2 trillion British thermal units and occurred primarily in natural gas and propane demand, as a result of a warmer winter which lessened demand for heating fuels.

1960-2006. Total energy consumption in 1960 in the residential sector was 78.22 trillion British thermal units, of which slightly more than half — 40.87 trillion British thermal units came from natural gas. By 2006, the total energy consumption in this sector had nearly doubled to 145.6 trillion British thermal units.

Changes in how and how much this sector uses becomes clear over the 46-year span. In 1960, electricity use only totaled 6.5 trillion British thermal units, but by 2006, electricity demand totaled 31.7 trillion British thermal units, a historical peak. Natural gas demand was 40.8 trillion British thermal units in 1960, peaked at 60.86 trillion British thermal units in 1972 and has generally declined by about a third since then. Propane demand in 1960 was 7.18 trillion British thermal units, peaked in 1972 at 15.0 trillion British thermal units and has declined to 5.1 trillion British thermal units in 2006. Electric system line losses are accounting for a larger share of the energy used in this sector as electrical use increases. In 1960, electrical line losses accounted for 16.0 trillion

British thermal units, but by 2006 amounted to 68.6 trillion British thermal units, approximately 47 percent of all the energy used in this sector in 2006.



Sources: State Energy Price and Expenditure Report. Energy Information Administration, Washington, DC. Nebraska Energy Office, Lincoln, NE.

Conservation

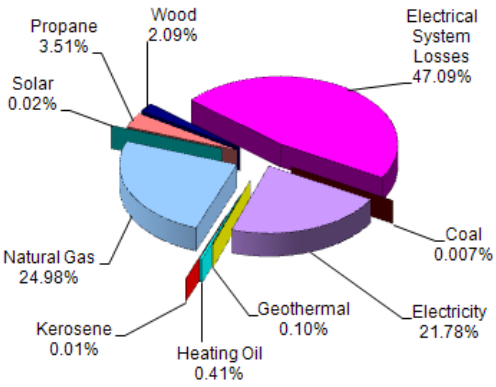
Conservation in the residential sector is influenced by price, weather and environmentalism. Like most sectors, residential users are extremely responsive to dramatic price rises. Increases in the price of natural gas, at various times over the decades, have resulted in reduced average annual consumption. Higher than normal heating bills have propelled homeowners to make energy saving improvements such as replacing aged furnaces with new efficient models, adding insulation and replacing windows and doors with more energy efficient ones.

Energy Need

2006. In 2006, energy prices for the two primary fuel types in the residential sector, natural gas and electricity increased over 2006 levels. Specifically, natural gas rose from $10.56 in nominal dollars per million British thermal units in 2006 to $11.15 in 2007 and electricity increased from $20.94 in nominal dollars per million British thermal units in 2006 to $21.72 in 2007. The annual average also increased from $15.16 in nominal dollars per million British thermal units in 2006 to $16.04 in 2007. Among the states, Nebraska ranked 44th lowest in average residential natural gas prices in 2006 at $11.30 measured in dollars per thousand cubic feet.

1970-2006.

Price is a factor determining energy need. A household's energy needs can differ considerably if the price of a necessary fuel increases dramatically in a short period of time. The energy needs of the residential sector come from two major fuel types: natural gas and electricity. Those needs are likely to be determined in predictable ways:



Sources: State Energy Data Report. Energy Information Administration, Washington, DC. Nebraska Energy Office, Lincoln, NE.

severity of winter and summer weather conditions and price volatility. In several of the first years of the 21st century, winter weather that was colder than the norm, combined with high gas prices to lower demand by residential users. In 2000-2001, residential natural gas prices rose from $6.40 to $8.57 in nominal dollars per million British thermal units. A similar event happened in 2002-2003 when residential natural gas prices rose from $6.17 to $7.83 in nominal dollars per million British thermal units. Similar rises were recorded in 2004 ($9.09) and in 2005 ($10.56). As a result, consumers replaced inefficient heating equipment with high-efficiency models reducing energy consumption and switch fuels from natural gas to electricity by installing an efficient heat pump.

In the 36 years since records have been kept, residential electricity prices have increased from $6.52 in 1970 to $21.72 in nominal dollars per million British thermal units, more than tripling in price. Residential natural gas prices have risen from 84 cents in 1970 to $11.15 in nominal dollars per million British thermal units, a more than 13-fold increase in 36 years far outstripping the price rise in electricity prices. The annual average has also risen from $1.84 in 1970 to $16.04 in nominal dollars per million British thermal units.

Industrial

The industrial sector includes manufacturing, construction, mining, agriculture and forestry operations. This sector relies on more diverse fuel types than the other sectors of the economy. Natural gas, electricity, coal and a variety of petroleum products — gasoline, asphalt, road oil, propane and diesel — are the primary fuel types utilized in industrial sector operations.

Energy Supply

2006. In 2006, more than one-third of energy used in the industrial sector was in the form of petroleum products, especially distillate oil (e.g. diesel). The next four primary fuel types used: natural gas (44.7 trillion British thermal units), electricity (30.6 trillion British thermal units), coal (8.2 trillion British thermal units) and biomass (4.5 trillion British thermal units).

Generally, supplies of these fuel types have been readily available to industrial users.

1960-2006. Trends in fuel types used in the industrial sector illustrate the dynamic needs of this sector and how industries can switch fuel types over time. The emergence of new industries such as ethanol plants can also alter fuel use patterns. For example, natural gas use in 1960 was 38.3 trillion British thermal units and soared in 1975 to 73.5 trillion British thermal units. Subsequent energy price spikes and other factors reduced natural gas consumption to 24.8 trillion British thermal units by 1990. Natural gas use peaked again in 1998 at 53.2 trillion British thermal units, before declining to 44.7 trillion British thermal units in 2007. Consumption of distillate fuel more than doubled from 1960 to 2006, rising from 14.0 trillion British thermal units to 30.1. Motor gasoline

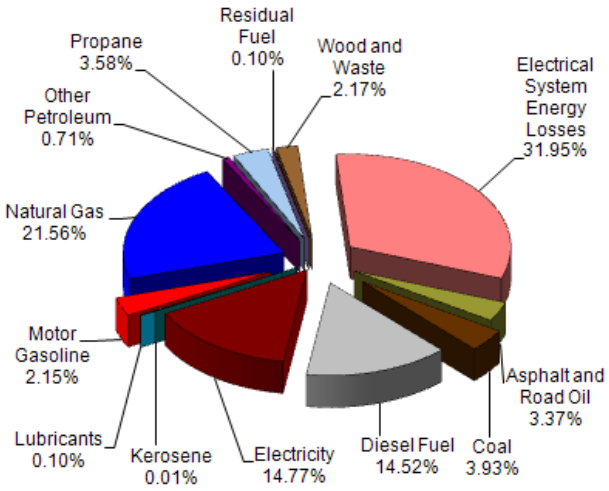
I N D U S T R I A L

consumption was nearly halved, dropping from 11.3 trillion British thermal units in 1960 to 6.7 in 2006. The growing use of electricity in this sector is demonstrated by the ten-fold increase from 3.0 trillion British thermal units in 1960 to 30.6 in 2006.

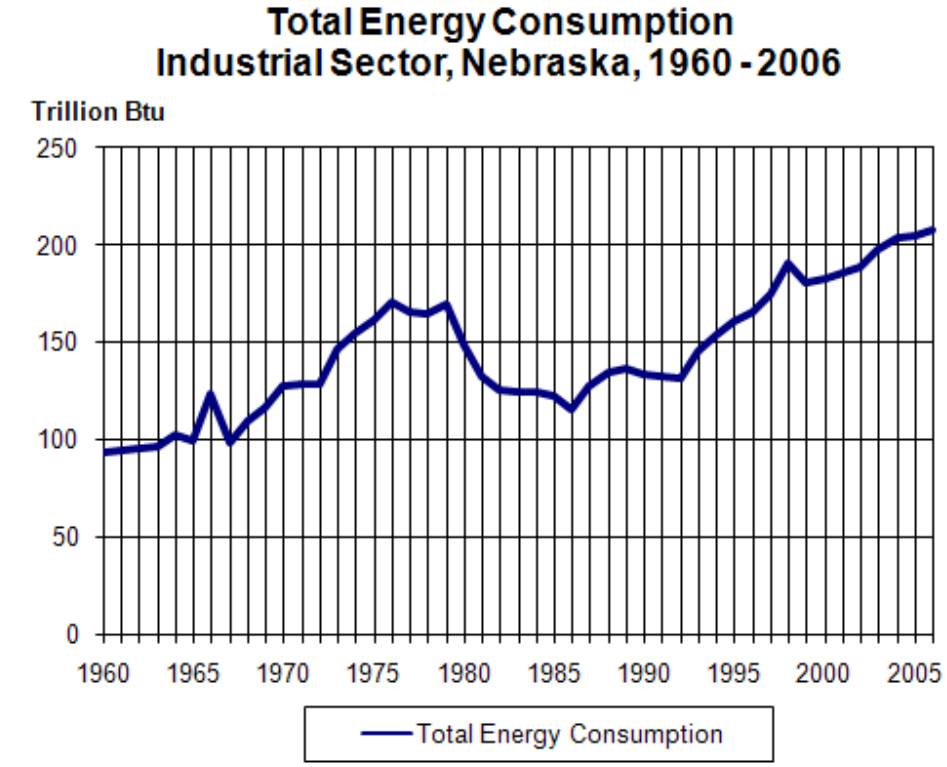
Demand

2006. More than 31.4 percent of the state's total energy consumption – 207.3 trillion British thermal units – was used in the industrial sector in 2006. The increase in demand from 2005 to 2006 totaled 4.6 trillion British thermal units, larger than the increase from 2004 to 2005.

1960-2006. In 1960, the industrial sector was the second largest energy user after transportation, 93.0 trillion British thermal units to 94.2 trillion British thermal units, respectively. By 2006, the industrial sector was the largest energy using sector, surpassing transportation by 30.7 trillion British thermal units.



Sources: State Energy Data Report. Energy Information Administration, Washington, DC. Nebraska Energy Office, Lincoln, NE.



Sources: State Energy Data Report. Energy Information Administration, Washington, DC. Nebraska Energy Office, Lincoln, NE.

Conservation

The industrial sector is more predisposed to making energy efficient system, lighting and building improvements than other sectors. If energy costs are a significant factor — and rising — industrial sector users are likely to find ways to reduce the cost and impact of energy on their operations. The roller coaster consumption of natural gas over the past 46 years noted in the energy supply section is an indicator of the impact of conservation of use, fuel switching or a combination of both.

Energy Need

Energy need in the industrial sector is subject to the ebb and flow of

business cycle and national, regional and local economic trends which can cause a spike or reduction in energy need and demand. As noted earlier, the surge in ethanol industry growth in the state added to this sector's energy needs for electricity and natural gas. The slowdown in ethanol production which began in 2008 will also be reflected when that data becomes available.

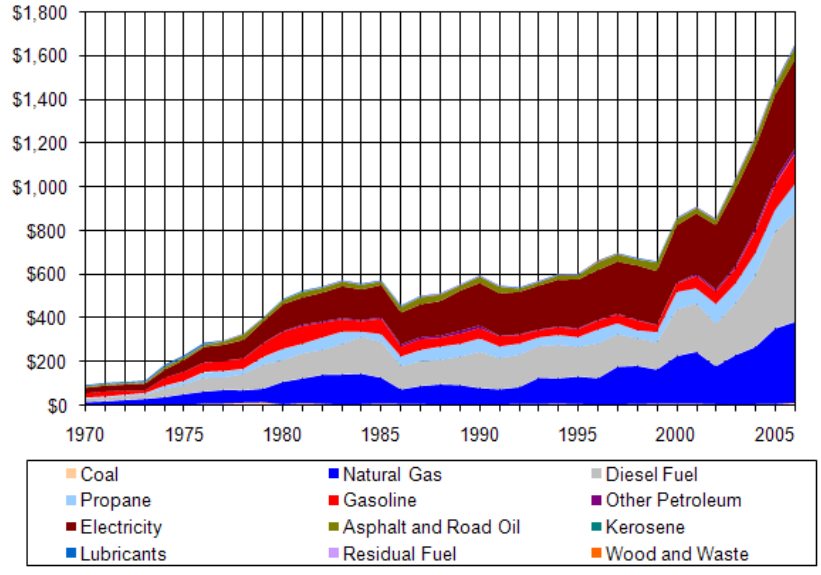
2006. Price can be a need altering factor in the industrial sector, which is more adept at fuel switching and conservation practices than other sectors. In 2006, the industrial sector spent $1.649 billion in nominal dollars for energy, an increase of $173.6 million in nominal dollars over 2005.

1970-2006. In 1970, the industrial sector spent $92.4 million in nominal dollars, less than 14 percent of total energy expenditures for all sectors. In 1970, industrial sector energy spending ranked third among the four sectors. By 2006, industrial sector expenditures of $1.649 billion in nominal dollars had risen to 18.7 percent among all sectors, and it still ranked third among energy-using sectors.

Just eight years ago in 1999, expenditures in the industrial sector totaled only $659 million in nominal dollars. In those eight years, spending in the industrial sector has increased by nearly $1 billion in nominal dollars. The most dramatic increases in those eight years were in refined petroleum products: propane expenditures more than doubled, gasoline expenditures tripled and diesel spending more than tripled. Natural gas expenditures more than doubled during that period.

"The surge in ethanol industry growth in the state added to this sector's energy needs for electricity and natural gas."

Ethanol plant expansion
York, Nebraska



Sources: State Energy Price and Expenditure Report. Energy Information Administration, Washington, DC. Nebraska Energy Office, Lincoln, NE.

Transportation

Traditional methods of transportation such as public and private vehicles, railroads, aircraft and boats are included in the transportation sector as well as energy used to transport oil and natural gas through pipelines.

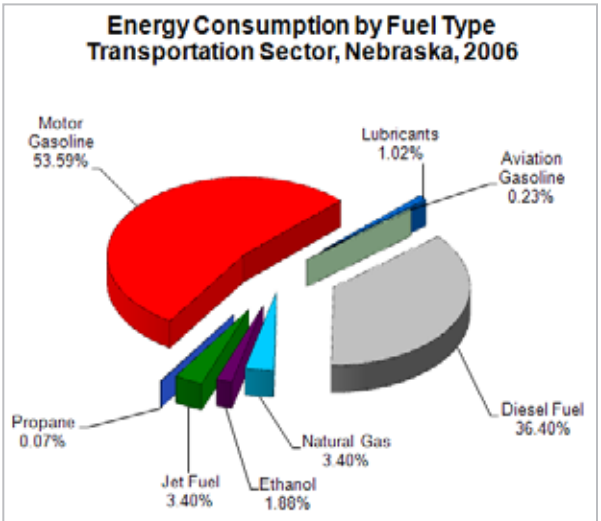
Energy Supply

2006. In 2006, more than 96 percent of energy used — 170.6 trillion British thermal units out of 176.6 trillion British thermal units — in the transportation sector was in the form of petroleum products,

especially distillate oil (e.g. diesel) and gasoline. The next two fuel types of any consequence were natural gas at 6.0 trillion British thermal units and ethanol at 3.3 trillion British thermal units.

Generally, supplies of these fuel types have been readily available to transportation users.

1960-2006. Trends in fuel types used in the transportation sector illustrate the static nature of this sector and how modes of transportation have changed little since 1960. The transportation sector was nearly totally dependent upon petroleum-based fuels in 1960, and remained just as dependent in 2006. The changes that occurred in the 46-year period primarily related to increased use. Renewable fuel, specifically ethanol, use began marginally in 1981 at .3 trillion British thermal units, and rose to a peak of 4.3 trillion British thermal units in 2005 before declining to 3.3 trillion British thermal units in 2006. Diesel fuel use in 1960 was 8.16 trillion British thermal units, peaked in 1998 at 77.19 trillion British thermal units and then declined to 64.3 trillion British thermal units in 2006. Motor gasoline use in 1960 was 67.07 trillion British thermal units, peaked in 1978 at 106.77 trillion British thermal units, and by 2006 had declined to 98.0 trillion British thermal units.



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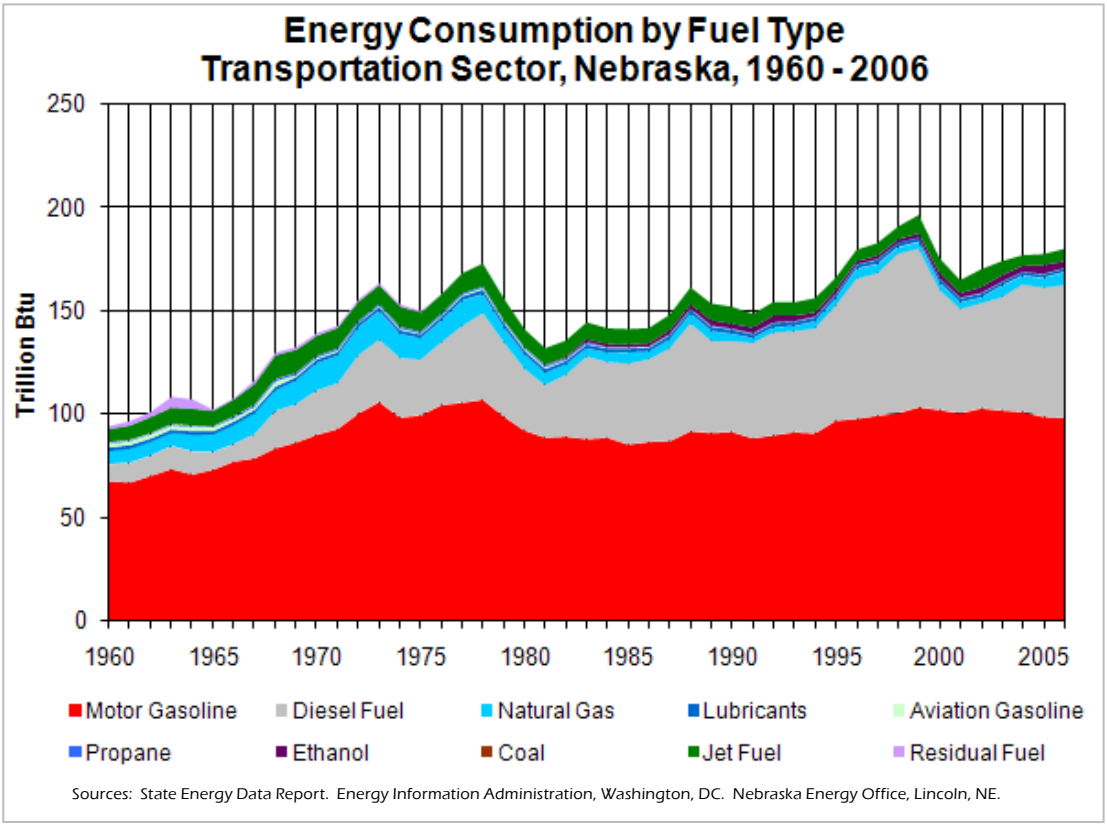


Sources: State Energy Data Report. Energy Information Administration, Washington, DC. Nebraska Energy Office, Lincoln, NE.

Demand

2006. More than a quarter — specifically 26.78 percent of the state's total energy

consumption — 176.6 trillion British thermal units — was used in the transportation sector in 2006. The increase in demand from 2005 to 2006 totaled 3.4 trillion British thermal units, larger than the increase from 2004 to 2005.

1960-2006. In 1960, the transportation sector was the largest energy using sector at 94.2 trillion British thermal units. By 2006, the transportation sector had been eclipsed as the largest energy using sector by the industrial sector, 176.6 trillion British thermal units compared to 207.3 trillion British thermal units, respectively.

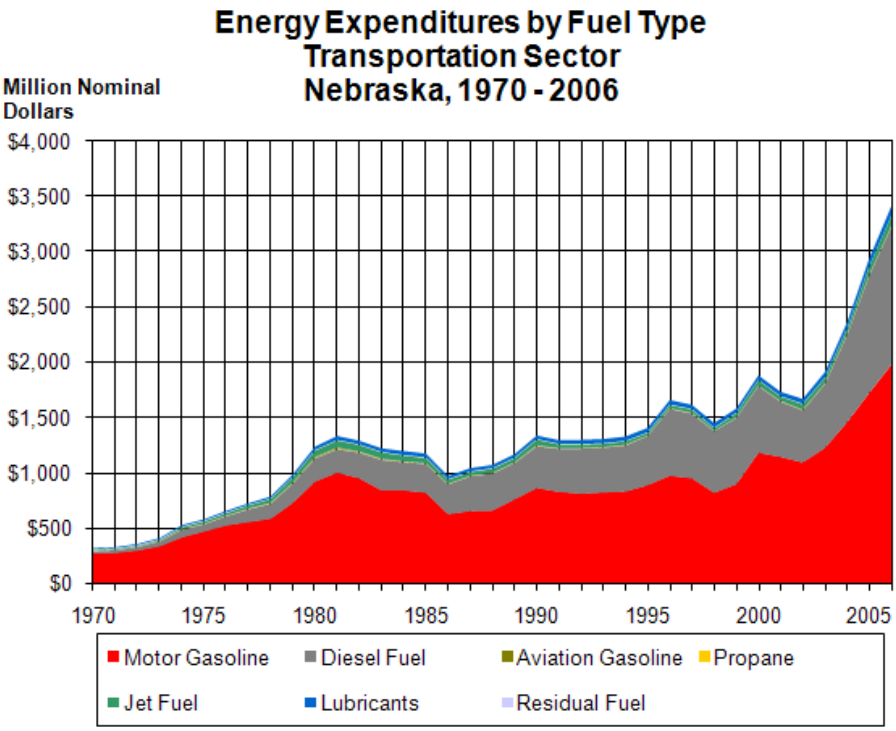
Conservation

The transportation sector is particularly resistant to conservation efforts. Over the decades, a variety of approaches by the state and federal governments have been tried to make this sector less dependent upon petroleum products: 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 light and carpooling/ridesharing.

Recent trends in this sector have thwarted conservation efforts. However, fuel price rises can induce conservation behavior. The price rise in petroleum-based fuels since 1999 has had an impact on demand. Peak total energy consumption in this sector was reached in 1999 at 194.4 trillion British thermal units. The precipitous decline in transportation sector use from 1999 to 2000 — from 194.4 trillion British thermal units to 172.8 trillion British thermal units continued into the following year. While consumption data for 2007 and 2008 is not yet available, expectations are that dramatic declines in this sector's energy use will be evident because of the price spikes that occurred in those years.

"Recent trends in this sector have thwarted conservation efforts. However, fuel price rises can induce conservation behavior."

I-80 traffic, Nebraska



Sources: State Energy Price and Expenditure Report. Energy Information Administration, Washington, DC. Nebraska Energy Office, Lincoln, NE.

T R A N S P O R T A T I O N

Energy Need

Trends in price and vehicle technology as well as federal government initiatives such as more efficient vehicles are expected to have an impact on energy use in this sector in the near term, leading to declines in consumption.

2006. In 2006, the transportation sector spent $3.406 billion in nominal dollars for energy, an increase of $476.1 million in nominal dollars over 2005.

1970-2006. In 1970, the transportation sector spent $317.0 million in nominal dollars, more than 47.5 percent of total energy expenditures for all sectors. In 1970, transportation sector energy spending ranked first among the four sectors. By 2006, transportation sector expenditures of $3.406 billion in nominal dollars had risen to 53.1 percent among all sectors, and it still ranked first among energy-using sectors.

Electric Utilities

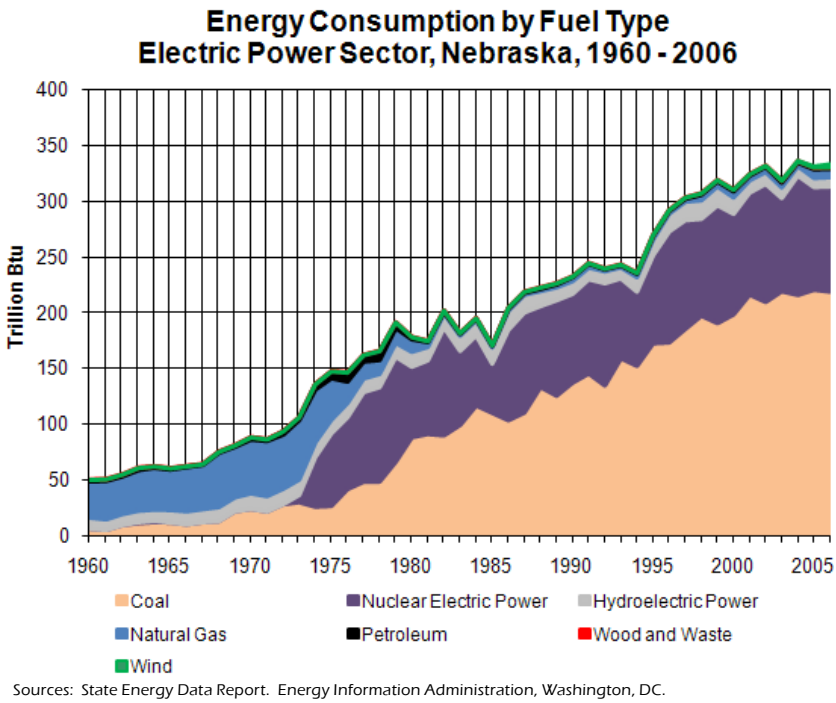
Information in this section consists exclusively of supply, demand, conservation and need by the state's electric utilities.

Energy Supply

2006. In 2006, 65.8 percent of the electric utilities energy supplies came from coal, 219.2 trillion British thermal units out of a total of 333.1 trillion British thermal units. The second most used fuel in this sector, nuclear, supplied 28.1 percent, or 93.9 trillion British thermal units. Three lesser fuel sources supplied nearly all the balance: hydropower, 2.6 percent, or 8.9 trillion British thermal units; natural gas, 2.3 percent, or 7.8 trillion British thermal units; and wind, approximately three-quarters of one percent, or 2.6 trillion British thermal units.

Generally, supplies of these fuel types have been readily available to consumers served by the state's electric utilities.

1960-2006. Trends in fuel types used by the state's electric utilities illustrate how the industry has evolved over 46 years. In 1960, more than 63 percent of the electricity generated came from natural gas, with hydropower and coal supplying most of the balance. The experimental nuclear reactor that was located at Hallam only operated between 1963-1964 and generated only marginal



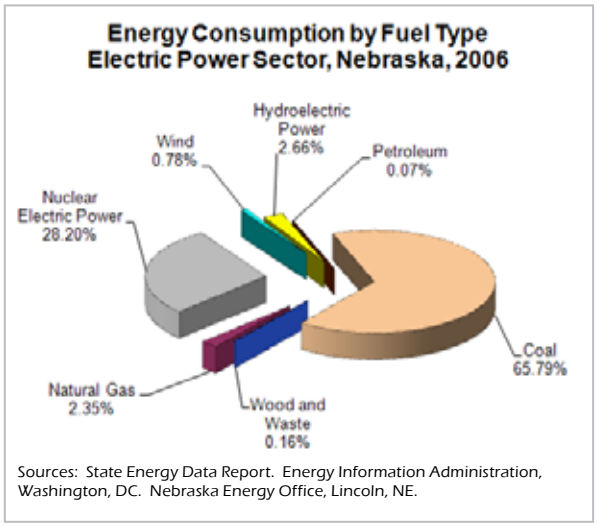
Sources: State Energy Data Report. Energy Information Administration, Washington, DC. Nebraska Energy Office, Lincoln, NE.

amounts of power before being deactivated. Coal use in this sector peaked in 2005 at 220.7 trillion British thermal units, natural gas used peaked in 1973 at 53.1 trillion British thermal units, nuclear power use peaked in 2005 at 106.7 trillion British thermal units, hydropower peaked in 1999 at 17.5 trillion British thermal units and wind use peaked in 2006 at 2.6 trillion British thermal units.

Demand

2006. The demand in the state's electric utility sector in 2006 totaled 333.1 trillion British thermal units, 2.05 trillion British thermal units more than in 2005.

Electricity purchases generated by hydropower for Nebraska utilities from the Western Area Power Administration in 2007 totaled 2.05 million megawatthours at an average price of .0257 cents per kilowatthour. The total cost of the power purchased in 2007 was $52.7 million. In 2005 — the latest year available for consumption data — the amount of power provided in 2005 from Western Area Power Administration met eight percent of the electricity demand.



Sources: State Energy Data Report. Energy Information Administration, Washington, DC. Nebraska Energy Office, Lincoln, NE.

1960-2006. In 1960, the state's electric utilities demand was 50.2 trillion British thermal units. By 2006, the demand in this sector had increased six-fold to 333.1 trillion British thermal units.

Conservation

Energy efficiency efforts in the electric utility sector generally result from technological advances in the generation and transmission of power.

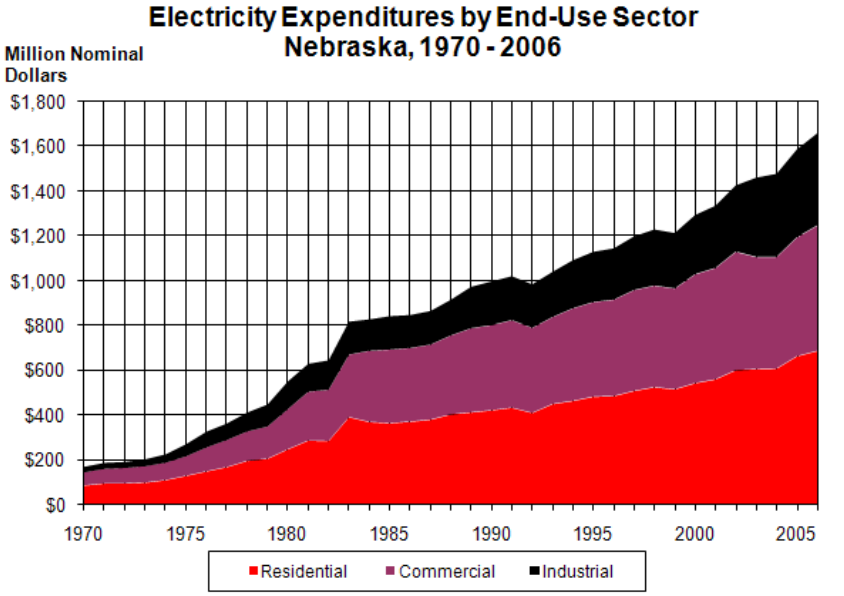
One on-going target of efficiency improvements is reducing electricity transmission line losses. While technological breakthroughs can lessen the problem, other improvements can be made. Local utilities estimate standard line loss at seven percent, but in some cases actual losses can be considerably higher — more than double the seven percent if preventative maintenance is not performed on a regular basis on utility lines. An example of future technologies: The copper wires used in typical transmission lines lose a percentage of the electricity passing through them because of resistance, which causes the wires to heat up. But "superconducting" materials have no resistance, and if they are used to transmit electricity in the future, very little of the electricity will be lost.

Another transmission technology in development by the U.S. Department of Energy's Office of Electric Delivery and Energy Reliability is overhead conductors. Research is underway on a high-strength, high-temperature overhead conductor, called the Aluminum Conductor Composite Reinforced, which can increase the current-carrying capacity of a transmission line by1.5-3 times over that of conventional conductors now in use without the need for tower modification or re-permitting. Adoption of ACCR technology would lessen the need for new transmission lines in Nebraska needed to export wind generated electricity.

Smart grid technology has garnered a great deal of attention. Smart electrical grids and

"Adoption of ACCR technology would lessen the need for new transmission lines in Nebraska needed to export wind generated electricity."

Western Nebraska transmission line.



Sources: State Energy Price and Expenditure Report. Energy Information Administration, Washington, DC. Nebraska Energy Office, Lincoln, NE.

accompanying communications infrastructures enable end-use efficiency, but deployment of this technology in Nebraska is probably not likely in the near term. One knowledgeable utility board member predicted that smart grid technology could save up to half of the energy currently wasted because of outdated transmission infrastructure.

Consumer behavior, also known as demand side management, can be a source of conservation from which the electric utility sector will benefit since the cheapest kilowatt is the one that doesn't have to be produced.

Energy Need

Nebraska's electric utilities more than met its customers needs, remaining net electricity exporters. The amount of electricity exported reached a peak of 7.1 billion kilowatthours in 1999. In 2006, the state's electric utilities exported 4.32 billion kilowatthours, an estimated 13.7 percent of net generation that year.

Trends in price as well as efficiency gains — offset by fuel switching by customers — are expected to have an impact on energy use in this sector in the near term. If growth continues in this sector, additional generation will be needed. New base load plants — primarily coal — are currently being constructed or planned. Smaller generation asset options have also been identified, especially those using wind.

2006. In 2006, the electrical utility sector expenditures totaled $281 million in nominal dollars for energy, an increase of $14.74 million in nominal dollars over 2005. Since 2001, electric utility sector expenditures have increased by nearly $100 million in nominal dollars.

As of July 2008, the Nebraska statewide average price for all sectors from all electric utilities was the 8th lowest rate in the country at 7.16 cents per kilowatthour. Nationally, electricity costs 49 percent more than it does in Nebraska.

1970-2006. In 1970, the electric utility sector spent $22.27 million in nominal dollars, less than one-tenth of what was spent in 2006, $281.0 million in nominal dollars. In the 36 years since 1970, coal expenditures increased from $8.47 million in nominal dollars to $175.8 million in nominal dollars in 2006, natural gas from $12.77 million in nominal dollars to $56.9 million in nominal dollars in 2006 and nuclear fuel from nothing in 1970 to $44.4 million in nominal dollars in 2006. Minimal expenditures were made for petroleum and wood and waste wood fuels.

STATE ENERGY RESOURCE ASSESSMENT

Nebraska is not a state rich in traditional fossil fuel resources.

Oil

Oil has been produced in the state since 1939. Oil production peaked in 1962 at 24.893 million barrels, and has declined precipitously since that time. In 2007, crude oil production increased by one percent over 2006 — the last increase was in 2000 — to 2.335 million barrels from 2.312 million barrels. In 2007, the Energy Information Administration estimated the state's crude oil reserves — an economic calculation — at 12 million barrels, about 1/10th of one percent of the nation's total crude oil reserves. In 2007, there were 1,184 active oil producing wells in the state.

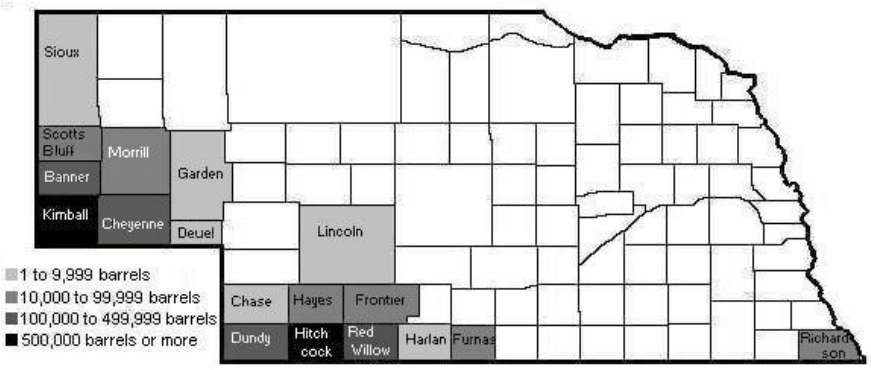
"Production of oil in the state is concentrated in two areas: the southwest, particularly Hitchcock county and in the Panhandle, especially in Kimball county. In 2007, these two counties produced more than half the oil mined in the state."

Oil Well, Scottsbluff County

Production of oil in the state is concentrated in two areas: the southwest, particularly Hitchcock County and in the Panhandle, especially in Kimball County. In 2007, these two counties produced more than half the oil mined in the state. The top five producing counties in 2007 (in rank production order: Kimball, Hitchcock, Red Willow, Dundy and Cheyenne.

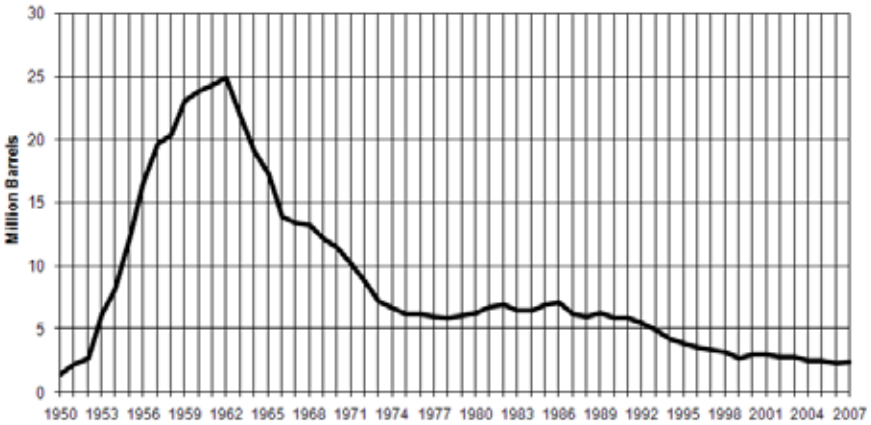
In 2005 (the latest year for state consumption data), Nebraska's crude oil production represented about 5.6 percent of the petroleum products used in the state that year.

Crude Oil Production By County in Nebraska, 2007



Sources: "Nebraska Oil Activity Summary." Nebraska Oil and Gas Conservation Commission, Sidney, NE. Nebraska Energy Office, Lincoln, NE.

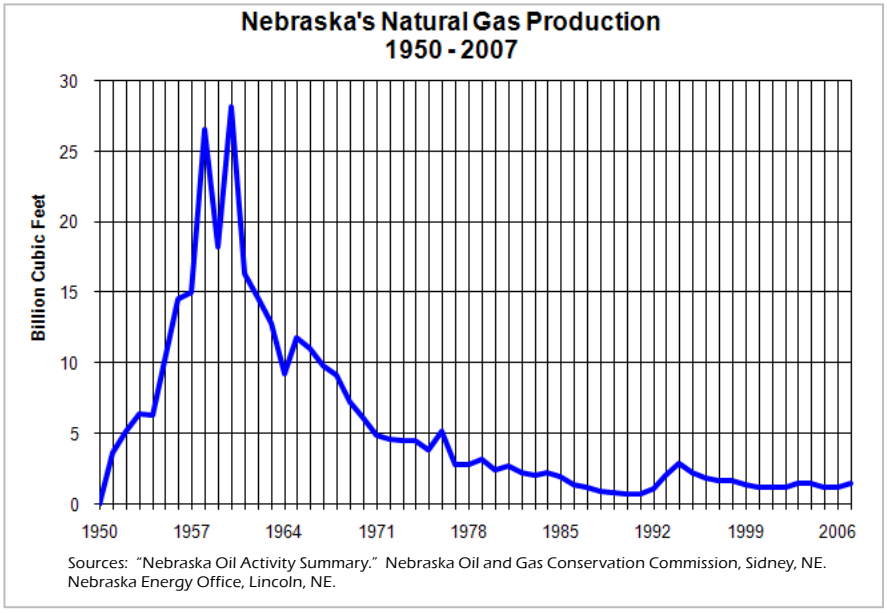
Crude Oil Production in Nebraska, 1950 - 2007



Sources: "Nebraska Oil Activity Summary." Nebraska Oil and Gas Conservation Commission, Sidney, NE. Nebraska Energy Office, Lincoln, NE.

STATE ENERGY RESOURCE ASSESSMENT

Natural Gas



Sources: "Nebraska Oil Activity Summary." Nebraska Oil and Gas Conservation Commission, Sidney, NE. Nebraska Energy Office, Lincoln, NE.

Natural gas has been produced in Nebraska since 1950. Natural gas production peaked in the state in 1960 at 28.189 billion cubic feet and has declined since that time. There have been several infrequent, yet minor, increases in production over the years. In 2007, natural gas production was 1.559 billion cubic feet, an increase of 28 percent above 2006 when only 1.217 billion cubic feet were produced.

In 2005 (the latest year for state consumption data), Nebraska's natural gas production represented only one percent of the natural gas consumed in the state in that year.

Coal

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

Uranium

Uranium has been mined in the state since 1991 at a site near Crawford, but must be sent outside the state's boundaries for processing.

Alternatives

In Nebraska, there are five viable alternate energy sources available: biomass, geothermal, hydropower, solar and wind. The U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy provides a brief overview of the state's alternative energy options at http://apps1.eere.energy.gov/states/alternatives/resources_ne.cfm

In 2005 (the latest year available), an estimated 3.6 percent of the state's energy consumption — 23.6 trillion British thermal units out of 654.9 trillion British thermal units — was met using renewable resources according to the Energy Information Administration. In 2004, by comparison, renewable energy resources provided 3 percent of the state's total energy consumption.

Each year, alternative energy resources and the energy generation provided by that resource are detailed.

Biomass

In 2005, wood and wood waste, landfill gas, methane, and ethanol provided 13.32 trillion British thermal units, primarily from 443,500 cords of wood and 52.794 million gallons of ethanol. This renewable energy category increased by about

30 percent over 2004, primarily as a result in expansion of ethanol production.

Biodiesel

Commercial scale biodiesel production began in Nebraska in 2006 and production was estimated to be around 2.4 million gallons in 2007. However, the price of soybeans used for feedstock seriously damaged this budding industry in the state in 2008. Biodiesel-blended fuel is available for purchase by the public at 13 stations in the state.

Ethanol

The most significant biomass energy resource in Nebraska continues to be ethanol that is produced from corn and grain sorghum. Ethanol production began in Nebraska in 1985 when 8.5 million gallons were produced at the state's first ethanol facility in Hastings. By 2007, ethanol production capacity had reached nearly 1.3 billion gallons of ethanol and the state became the nation's second largest producer of ethanol. While ethanol production was projected to increase by 24 percent over 2007, rising feedstock prices and unfavorable ethanol price factors will likely make that projection unattainable. In the near-term and until market profitability returns to ethanol production, any projection of production is speculative. The state's Ethanol Board estimated that 30 percent of Nebraska's corn crop and the equivalent of three-quarters of the state's grain sorghum crop are used in the production of ethanol.

"The state's Ethanol Board estimated that 30 percent of Nebraska's corn crop and the equivalent of three-quarters of the state's grain sorghum crop are used in the production of ethanol."

Ethanol plant, near Omaha

Ethanol consumption in the state comes mainly in the form of E10 blended gasoline — 10 percent ethanol and 90 percent gasoline. Smaller quantities of E85 — 85 percent ethanol and 15 percent gasoline — are also sold. Ethanol-blended fuel consumption in 2007 was 543.1 million gallons, a 24 percent increase over 2006 and a new historic high. Ethanol's share of the fuel market in 2007 reached a new high: nearly 66 percent of all fuel sold was an ethanol blend. The previous high of more than 62 percent was set in 2005.

Landfill Gas and Methane

A small, but slowly increasing amount of electricity is being generated from methane at former landfills, currently operating wastewater sewage plants and one livestock anaerobic digester in Butler County. Energy production from biogas resources has been tracked since 1995 when 1.06 million kilowatthours was produced. In 2007, reporting Nebraska production facilities produced 66.88 million kilowatthours of electricity.

Geothermal

There are two types of geothermal resources that can be utilized for energy: hydrothermal 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 of the state. The Geo-Heat Center at the Oregon Institute of Technology has identified nine collocated communities in the state. A collocated community is one being within eight kilometers of a geothermal resource with a temperature of at least 50 degrees Celsius. In Nebraska the nine towns meeting that standard are located in just four counties: Cheyenne — Brownson, Huntsman, Lodgepole, Ordivlle, Potter and Sidney; Keya Paha — Burton; Kimball — Kimball; and Scottsbluff — Gering. These resources might be suitable for development, but that prognosis appears unlikely in the near term.

Earth energy can be used directly to provide heat in a variety of applications, such as geothermal heat pumps and appears to offer Nebraskans the most economical and practical 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 in cold weather appears strong and is a technology that is being promoted by the state's larger electric utilities.

In 2005, 2.4 percent of the state's total renewable energy consumption — 0.59 trillion British thermal units — came from geothermal resources. That was a slight increase over the 0.52 trillion British thermal units in 2004.

"In 2005, 8.71 trillion British thermal units of hydropower were consumed in Nebraska which accounted for 36.9 percent of all renewable energy consumed that year."

Kingsley hydro power plant, Lake McConaughy, Nebraska.

Hydropower

The electricity consumed in Nebraska from hydropower resources came from two sources: the 11 dams in or on the border of the state and from purchases of Western Area Power Administration electricity. Usually the amount of electricity produced is relatively constant from year to year, unless affected by drought conditions or a facility is off line. As the state's energy need continues to grow, less and less of the need will be met by the relative constant amount of hydropower produced.

In 2005, 8.71 trillion British thermal units of hydropower were consumed in Nebraska which accounted for 36.9 percent of all renewable energy consumed that year. In 2004, 9.2 trillion British thermal units came from hydropower and represented 47 percent of the all renewable energy consumed that year.

Studies of the state's hydropower resources were conducted in 1981 and again in 1997. For the most part the studies concluded that nearly all of the potential hydro resources had been developed, and that even under the most optimistic scenarios, less than 150 MW of additional power could be produced from existing or new hydro resources. It is appears unlikely that any additional hydropower resources will be developed within the foreseeable future.

Solar

According to an assessment by the Energy Information Administration, Nebraska has "good" solar resources, especially in the western part of the state.

There are two types of solar collectors: concentrating collectors and flat panels. Solar collectors are simply flat panels that can be mounted on a roof or on the ground. Called flat plate collectors, these are typically fixed in a tilted position correlated to the latitude of the location. This allows the collector to best capture the sun. These collectors can use both the direct rays from the sun and reflected light that comes through a cloud or off the ground. Because they use all available sunlight, flat plate collectors are the best choice for many northern states such as Nebraska. For flat plate collectors, Nebraska has good, useful resources throughout the state. For concentrating collectors, Nebraska has useful resources for many technologies, especially in the western region of the state.

Presently, solar technologies are marginally deployed in great part because it is difficult for solar technologies to be cost competitive with the state's low electric rates. Where solar does make sense economically are in meeting the needs of cattle ranchers in remote regions where photovoltaic systems are less expensive than installing new transmission lines. Omaha Public Power District has operated two solar photovoltaic panels at its Elkhorn facility since 2002. In 2007-2008, 5,899 kilowatthours were produced from these panels.

In 2005, solar energy accounted for .02 trillion British thermal units of all renewable energy consumed in the state. In 2004, an estimated .01 trillion British thermal units of energy were produced from the state's solar thermal and photovoltaic resources.

Wind

The U.S. Department of Energy's Wind Powering America program indicates that Nebraska has wind resources consistent with utility-scale

"The state could produce as much as 7,800 MW of new electricity from wind resources annually. The American Wind Energy Association ranks the state 6th in the nation with the greatest wind energy potential."

Wind turbines near Kimball, Nebraska.

production of electricity. Maps of the state's wind resources at different heights are located at http://www.neo.ne.gov/renew/wind.htm as well as a wealth of other wind informational tools. Other wind energy assessments have suggested the state could produce as much as 7,800 MW of new electricity from wind resources annually. The American Wind Energy Association ranks the state 6th in the nation with the greatest wind energy potential.

In 2008, more than 200 million kilowatthours were generated by wind energy in Nebraska, nearly the same amount of generation as in the previous year. Nebraska has 46 operational turbines with a total capacity of 71.88 megawatts. The average annual output from the turbines is sufficient to provide power to about 21,500 homes for a year. A complete list of sites and generation is available at http://www.neo.ne.gov/statshtml/89.htm

Omaha Public Power District, Nebraska Public Power District and NMPP Energy have asked for proposals for up to 190 megawatts of wind generated electricity. More details should be known about any successful proposals in 2009.

In 2005, wind energy produced 0.97 trillion British thermal units, less than one-half of one percent of all renewable energy consumed in Nebraska and little changed from 2004.

As of March 2008, the state ranked 21st among all states in installed wind energy capacity with 73.38 MW according to the American Wind Energy Association. When the two wind farms currently under construction near Bloomfield and Crofton become operational with 122 megawatts, the state could vault to 16th position on the list, if other states' wind energy generation remains constant. An additional 180 megawatts, would push the state to 13th among all the states.

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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