

NEBRASKA ENERGY OFFICE

The Programs

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, is customer oriented, and is 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.

The Nebraska Energy Office operates a number of different programs. These programs can be categorized as follows: low-income weatherization, oil overcharge-funded activities and state energy program and organization activities. An overview of the 2006-2007 financial activity appears at the end of this section. The period covered by this report is from July 1, 2006 to June 30, 2007, 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-fifth of the homes weatherized were inspected by agency staff.

In fiscal year 2006-2007, 1,429 homes were weatherized by Energy Office subgrantees. This effort received a total of \$6,337,462 from two sources: \$2,415,120 from the U.S. Department of Energy's Low Income Weatherization Assistance Program and \$3,922,342 from the Low Income Home Energy Assistance Program.

Since the program's inception in 1979, \$104.56 million has been spent to make energy efficiency improvements in 59,897 homes. An estimated 51,000 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 \$79.5 million have been achieved. About \$4.4 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

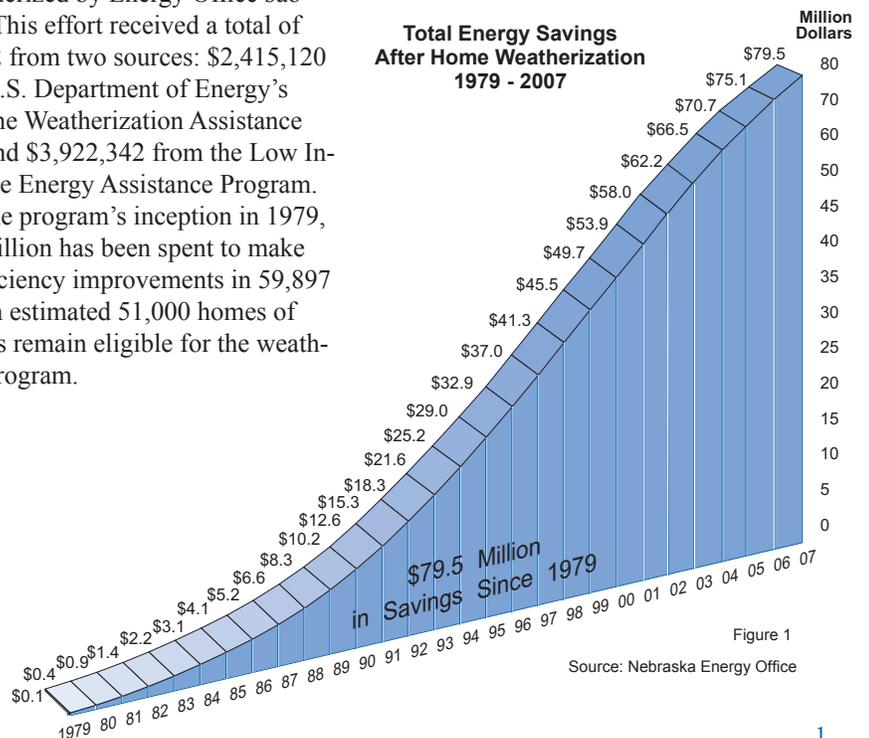


Figure 1
Source: Nebraska Energy Office

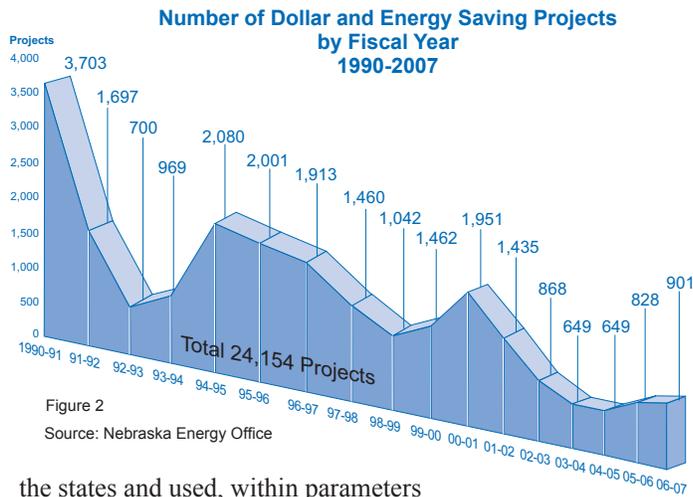


Figure 2
Source: Nebraska Energy Office

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 finance home, building, transportation and system improvements. Presently, there are 322 Nebraska banks, savings institutions and credit unions at 866 locations across the state eligible to provide 5 percent or less interest rate financing for up to 10 years on loans for energy efficiency improvements and waste minimization projects.

By June 30, 2007, 24,154 projects totaling nearly \$207.48 million have been financed with a combination of low-interest loans from the Energy Office and participating lenders and funds from borrowers for non-eligible improvements. Of that total, the Energy Office has provided more than \$89.1 million which leveraged nearly \$118.3 million from Nebraska lenders. These projects also leveraged from borrowers an additional \$25.8 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, 901 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 11 types. More than 80 percent of the loan funds have financed improvements in just three categories:

agriculture, residential and small business. Summaries of loan categories appear in Figure 3 and the three largest are detailed as follows:

Agricultural Improvements

Improvements in agricultural equipment and systems rank fourth in the use of low-interest financing. More than 5.5 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 566 agricultural projects with 621 specific improvements totaling \$10.644 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 70 percent of all the funds loaned finance residential

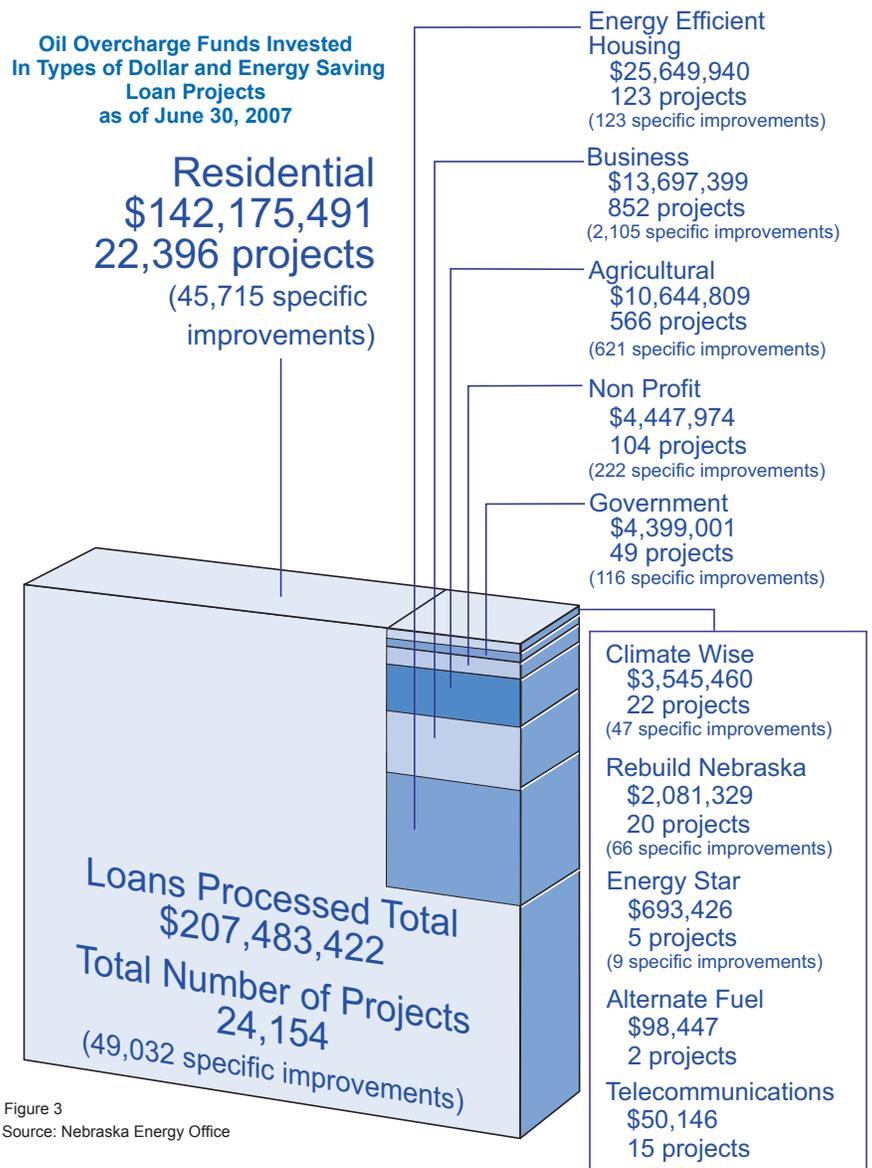


Figure 3
Source: Nebraska Energy Office

**Nebraska Energy Settlement Fund
A Summary of Exxon, Stripper Well and Diamond Shamrock
Oil Overcharge Funds as of June 30, 2007**

	<i>Exxon</i>	<i>Stripper Well</i>	<i>Diamond Shamrock</i>	Total
Funds Received	\$15,504,944	\$15,652,671	\$359,172	\$31,516,787
Interest Earned and Miscellaneous Income	\$10,757,942	\$8,186,755	\$245,783	\$19,190,480
Total	\$26,262,886	\$23,839,426	\$604,955	\$50,707,267
Funds Budgeted	\$26,262,886	\$23,450,226	\$604,955	\$50,318,067
Low Income Designated	\$0	\$95,617	\$0	\$95,617
Uncommitted Balance	\$0	\$293,583	\$0	\$293,583

Source: Nebraska Energy Office

Figure 4

improvements such as replacing or installing furnaces, air conditioners and heat pumps, replacing windows and doors and insulating walls and ceilings. To date, 22,396 projects with 45,715 specific improvements totaling more than \$142.175 million have been undertaken by Nebraskans.

Business Improvements

Nearly 6.3 percent of all energy efficiency financing, \$13.697 million, has been used to make 2,105 specific improvements in 852 buildings and systems in businesses in the state, ranking second-highest among all active loan categories. Typical business improvements include replacement of furnaces and air conditioners as well as insulation, lighting and replacement doors and windows.

State Energy Program



In 2006-2007, Nebraska received \$338,000 for this federally-funded effort and supplied \$84,200

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, 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 Projects 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/greenbuilt_homes.htm



A Certified Nebraska Green Built HomeSM in Lincoln

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.

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

The Special Projects 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 will be completed by 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. During the reporting period, five additional building owners were recruited and two additional comprehensive energy studies were completed for two selected facilities. The project is scheduled for completion by September 30, 2007.

Energy Star: Using Promotion Activities and Financing Incentives to Increase Use of Energy Star-labeled Products in Nebraska



In July 2005, the agency received a \$20,000 grant from the U.S. Department of Energy to increase the use of ENERGY STAR products in the state through the use of promotion, marketing and coordinating the national ENERGY STAR effort with the agency's Dollar and Energy Saving Loans.

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 as well as electronics and office equipment.

During the reporting period, work was completed on the redesign and formatting of loan application forms and a promotional brochure and printing of the forms and brochures was completed. In addition, a mailing to lenders was prepared and distributed summarizing the revised Dollar and Energy Saving Loan program standards and the inclusion of ENERGY STAR as the standard for pre-qualified products. This project was completed by June 2007.

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. During the reporting period, 16 additional building owners were recruited, 14 additional buildings were evaluated and dedicated energy meters were installed in an additional six buildings. The project is scheduled for completion by September 30, 2007.

State Heating Oil and Propane Program

During the reporting period, the Energy Office began its sixth 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.

Western Governors' Association: Life Cycle Bioenergy and Environmental Impact Simulator

In November 2005, the agency received a competitively awarded grant for \$70,000 to develop an easy-to-use computer software model to estimate energy yield, energy efficiency and environmental impact of biorefinery corn-to-ethanol, stover, and grain sorghum production systems based on component technologies and environmental conditions. The University of Nebraska-Lincoln Agronomy and Horticulture Department is developing the software.

At the end of the reporting period, \$17,308.97 had been expended. This project is scheduled for completion July 31, 2007.

Wind Powering America 2005 and 2006

For a number of years, the agency has received annual grants from the U.S. Department of Energy to promote wind energy understanding, production and consumption in the state.

In June 2006, the agency received an additional grant of \$20,000. The grant supported wind energy outreach informational activities at the Nebraska State Fair, Husker Harvest Days as well as other venues. The grant also provided support for agency wind activities.

The work under this grant was completed by June 30, 2007 and all the funds were spent.

Organizations



Governors' Ethanol Coalition

Nebraska was the driving force in the Coalition's creation in 1991. Today, there are 35 members spanning from Hawaii, Oregon and Washington in the West to the Carolinas and New York in the East. There are also six 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.

In late 2006, the Governors' Ethanol Coalition released a report, *Ethanol from Biomass: How to Get to a Biofuels Future*, <http://www.ethanol-gec.org/information/biomassstoethanol2006.htm> which has four recommendations:

- Expand the Renewable Fuels Standard (RFS) to include a short-term target of 12 billion gallons a year of ethanol and biodiesel utilization by 2010, and longer-term British thermal unit-based targets of 15 percent of total motor fuels consumption by 2015 and 25 percent by 2025, with equal incremental steps provided for each year in between;

Governors' Ethanol Coalition Members

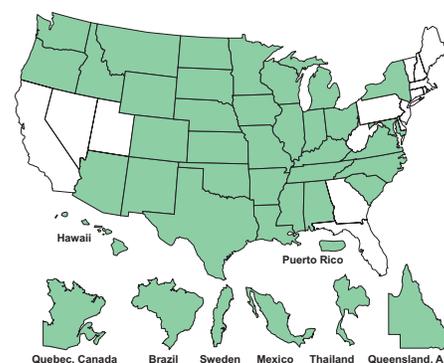
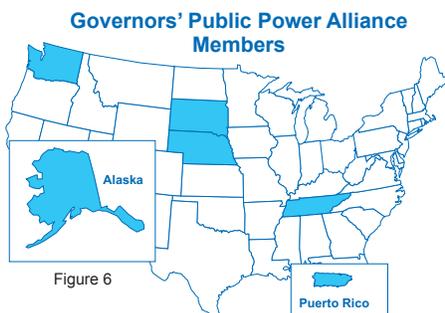


Figure 5

- Assign a financial value to the RFS cellulosic ethanol 2.5:1 trading credit into a more practical credit.
 - Establish a timetable for delivering 85% ethanol/15% gasoline infrastructure on a regional basis within five years.
 - Provide adequate funding for the *Energy Policy Act of 2005* authorized biofuel research, demonstration and incentive programs.
- Nebraska's governor led the Coalition in calendar year 2007.

Governors' Public Power Alliance

This bi-partisan coalition of six governors was formed in 1998 so consumers served by publicly-owned electric systems would not be disadvantaged as the electric industry was restructured. The governors of Nebraska and Tennessee serve as co-chairs of the Alliance.



Nearly one-quarter of the nation is served by consumer-owned systems, including all electric utilities in Nebraska.

During the reporting period, the Alliance monitored federal legislative activity.

Biopower Steering Committee

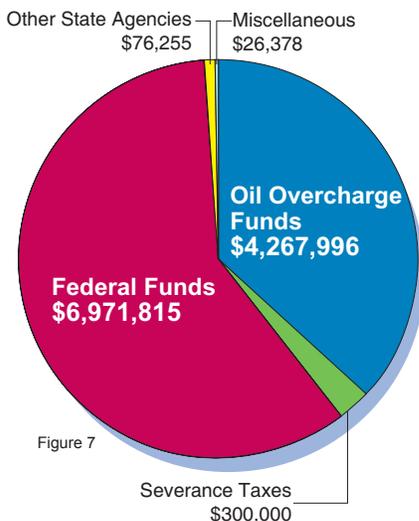
Authorized by the Legislature through 2008, the Energy Office provides assistance to this 12-member group. The Committee's task is to foster the use of bio-based resources as energy production resources.

Financial Activity



In 2006-2007, the expenditures for the agency totaled \$11,642,444 and includes federal, state, oil overcharge and miscellaneous state funds. The source of the funds is illus-

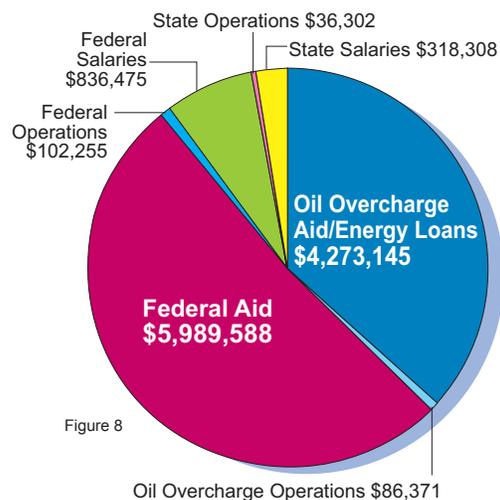
Where the Money Came From as of June 30, 2007



trated in Figure 7. More than 60 percent was derived from federal sources. More than 37 percent of the funding came from oil overcharge accounts.

More than 51 percent of all federal funds were spent as aid in the Low-Income Weatherization Assistance Program. More than 36 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 1-3 in this report. Complete expenditure details are found in Figure 8.

Where the Money Went as of June 30, 2007



(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, 81-161, 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 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.ne.gov/statshtml/index3c.html>

State-wide Energy Need and Cost



In 2004, the state's total energy consumption was 651.9 trillion British thermal units, an increase of less than one percent from 646.4 trillion British thermal units in 2003. Petroleum and nuclear demand increased in 2004 as compared to 2003. Use of coal, renewable energy and natural gas decreased in 2004 over 2003.

(2004 is the most recent year for which consumption, expenditure and price data are available.)

Total energy expenditures in 2004 increased almost 15 percent above 2003 figures to \$5.404 billion. Expenditures in 2004 for petroleum, accounted for 56.9 percent of the total and natural gas accounted for 16.0 percent of the total.

The 2004 prices for different types of energy, as compared to other states, reveals Nebraskans paid the second lowest price for coal in the nation, and less than half the national average. The rankings are calculated by the Energy Information Administration (EIA). Retail electricity ranked 46 in price, and petroleum ranked 17. Natural gas, another key energy source for Nebraskans, ranked 31 in price.

According to the EIA, Nebraska ranked 37 in 2004 in total energy expenditures among the 50 states and the District of Columbia (Texas was the highest and the District was the lowest). The state was 21 in the ranking of expenditures per person at \$3,093 (Alaska was the highest and Utah was the lowest).

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 caused farmers to alter practices such as when and how much anhydrous ammonia fertilizer — a natural gas product — is used. To combat high diesel fuel prices, some farmers have adopted conservation tillage practices.

In the past several years, more than 200 farmers have been successful in

securing USDA 9006 grants to finance efficiency upgrades for irrigation equipment and to switch from using diesel or natural gas to power the systems to electricity. This trend will likely continue if natural gas and diesel prices remain high and federal incentives remain available.

Energy Need

Energy costs are a significant agricultural expense. In 2005, the U.S. Department of Agriculture stated that energy costs, on average, account for about 15 percent of total agricultural expenses. In Nebraska in 2004, farm expenditures rose by 7.3 percent to \$9.88 billion. Increases were due to the rise in costs for tractors and machinery, fuels, fertilizer, feed and labor. Expenditures per farm or ranch averaged \$204,555 in 2004, up from \$189,897 according to the USDA Nebraska Agriculture Statistics Service.

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 2001 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



The commercial 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

In 2004, nearly 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

In the past four years, 2001-2004, demand in the commercial sector has fluctuated marginally; up one year, down the next, then up the following year. In 2004, net energy use increased 2.5 percent to 63.4 trillion British thermal units over 2003. Total energy use also increased, but by a smaller 0.8 percent to 127.9 trillion British thermal units. The demand by fuel types in 2004 over 2003: electricity was down by 1.0 percent over 2003, coal consumption decreased by 38 percent; consumption increases were recorded for renewable energy, up 2.5 percent and natural gas use increased 4.9 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 readily available.

Residential



Energy Supply

Nearly 88 percent of the energy used in the residential sector in 2004 came from only two sources: electricity and natural gas. Nearly 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 in 2004 decreased in net energy use by 6.1 percent over 2003 to 77.8 trillion British thermal units. Decreases in 2004 were reported in electricity, down 1.1 percent, natural gas, down 8.9 percent and petroleum down 14.4 percent.

The 40-plus-year trend of increasing use of electricity in households, from 62.1 trillion Btus of net energy consumption in 1960 to 77.8 trillion Btus in 2004, illustrates the wide adoption by Nebraskans of energy-consuming 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 increased natural gas prices — as occurred in 2002-2003 when natural gas prices increased from \$6.17 to \$7.83 per million British thermal units — resulted 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, coal and various petroleum products — gasoline, asphalt, road oil and 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, net energy demand in this sector has grown from 85.5 trillion Btus in 1960 to 140.1 trillion Btus in 2004. In 2004, electricity use increased 2.3 percent, petroleum use increased 7 percent and natural gas use increased 3.1 percent from 2003. Coal use decreased 4.4 percent and renewable energy use decreased 0.3 percent.

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, and has only climbed to 39.6 trillion Btus in 2004.

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 state has 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, railroads, 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 has nearly doubled since 1960, rising from 94.2 trillion Btus to 174.1 trillion Btus in 2004. In 2004, energy demand increased by 1.8 percent from 2003, rising from 170.94 trillion British thermal units. Demand for diesel fuel increased almost eight-fold since 1960 from 8.17 trillion Btus to 61.68 trillion Btus in 2004. Gasoline and diesel fuel account for nearly 96 percent of the resource types used in the transportation sector.

Factors that affect this sector include population growth, replacement of vehicles with more or less efficient ones and the number of miles traveled each 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. However, 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 was reached in 1999 at 194.4 trillion Btus. The precipitous decline in transportation sector

energy consumption from 1999 to 2000 from 194.4 trillion Btus to 172.76 trillion Btus continued into 2001, falling to 162.58 trillion Btus. However, since 2002 energy demand has increased each year, rising from 167.25 trillion Btus in 2002 to 174.06 trillion Btus in 2004.

Energy Need

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

Electric Utilities



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

Energy Supply

Trends in the electric power sector in Nebraska have remained generally constant over time: more than 90 percent — 96 percent in 2004 — of the fuels used to generate, distribute and transmit electricity has come from just two resource types: coal and nuclear electric power. In-state hydropower resources used to generate electricity have declined over the past three years because of drought conditions and accounted for 2.72 percent of electricity production in 2004. Wind generated electricity was 0.385 trillion Btus in 2004, a slight decline from 2003.

Demand

Since 1960, energy demand by electric utilities increased more than six-fold from 50.2 trillion Btus to 336.3 trillion Btus in 2004. Demand in the past six years, from 1999 to 2004, has seesawed back and forth — up one year and down the next.

Conservation

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

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 met customers needs and more, remaining net exporters of electricity. The amount of electricity exported reached a peak of 7.2 billion kilowatthours in 1999. In 2004, utilities exported 4.3 billion kilowatthours, an estimated 13.7 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 to use 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 2006, oil production declined to 2.312 million barrels from 2.413 million barrels in 2005, a decrease of 4.2 percent from 2005. In 2004 (the latest year for consumption data), the state's crude oil production represented only 5.6 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 several infrequent and minor increases in production, the last ones occurring in 2003 and 2004. In 2006, 1.217 billion cubic feet of natural gas was produced, an increase of 1.4 percent, over natural gas production in 2005. In 2004, natural gas production represented only 1.3 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 46 operational wind turbines generating electricity. In 2007, more than 218 million kilowatthours — enough for more than 21,500 homes — were generated. The amount of electricity generated in 2007 was approximately 44.36 million kilowatthours less than produced in 2006. While the shutdown of the two turbines at Springview contributed to the decline, an overall reduction in production was noted at all wind energy sites in the state. Energy generated by the turbines is estimated to supply less than one percent of energy consumption in Nebraska, based on 2004 consumption data, the latest available.

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/states/alternatives/resources_ne.cfm

In 2004, an estimated 3 percent of the state's total energy consumption was met from renewable resources, down 1 percent from 2003. Total energy consumption in 2004 was 651.87 trillion Btus of which 19.52 trillion Btus came from renewable sources.

Assessments of the five feasible alternatives follow:

Biomass

In 2004, wood, landfill gas, ethanol and wood waste provided an estimated 9.4 trillion Btus, less than two percent of the state's energy need that year.

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 2004, more than

36.16 million gallons of ethanol were consumed in Nebraska.

In 2006, there were 20 operating plants that produced over 600 million gallons of ethanol, an increase of more than 13 percent over the volume produced in 2005. More ethanol plants are expected to be operational or complete expansions in 2007. By the end of 2007, Nebraska is projected to become the nation's second largest ethanol producing state, after Iowa. Nebraska production capacity is estimated to be more than one billion gallons of ethanol yearly, or about 14 percent of all ethanol produced in the nation. An additional 728 million gallons of production capacity is under construction, including expansion plans at existing facilities.

The state's ethanol board estimates that 30 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 2006. As production increases, these percentages will also increase.

Geothermal

There are two types of geothermal resources that can be utilized: hydrothermal fluid resources and earth energy. According to the Energy Information Administration, there are two pockets of high-temperature 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 2004, an estimated 0.52 trillion Btus were produced from geothermal resources in the state.

Hydropower

In 2004, 47 percent, 9.2 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 2004, an estimated 0.01 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 additional wind generation capacity is positive. About 150 megawatts of new generation is expected to be approved in 2007. Federal and state policy initiatives may speed construction of added generation beyond 2007. A known barrier to increased generation is transmission line capacity in the windiest regions of the state.

Interest in residential scale wind turbines, capable of meeting or exceeding

the needs of a single household, is also rising. A barrier to continued growth in this area is the lack of a state net metering law.

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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