

Nebraska

NEBRASKA ENERGY OFFICE

1988

ANNUAL REPORT



This Annual Report covers the period from July 1, 1987 through June 30, 1988. This Report is published pursuant to Nebraska Revised Statutes, Sections 81-1607 and (R.S. Supp., 1988). Copies are on file with the Clerk of the Legislature and the Nebraska Library Commission.

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Rate of Return on Investment (R.O.I.) calculations used throughout this Annual Report are based on the estimated annual cost of energy saved divided by the amount spent to make the improvement (excluding state and local administrative costs). Unless indicated, they are for the first year only. Where fifteen year Return on Investment calculations are cited, a simple formula which does not take into account the expected fluctuations in energy prices or the changing value of money over time is used.

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February 15, 1989

Dear Nebraskans,

When it comes to matters of energy management and security, many Americans seem to have forgotten a time only fifteen years ago when oil was in short supply and prices were staggering. Memories of the oil supply disruptions and shortages the nation experienced during the OPEC oil embargo of 1973 and the 1979 Iranian Revolution have quickly faded in light of current low energy prices and readily available energy supplies.

Such complacency has closed some eyes to a hard-learned lesson of the past — that energy situations can change suddenly, but adjustments and solutions take time. Current indications are that the U.S. is moving again toward the same level of energy dependence it experienced in the 1970s. Oil demand is rising again and the U.S. now depends on foreign sources for 40 percent of its oil supplies. The current presence of U.S. forces in the Persian Gulf is an uneasy reflection of both the significance and insecurity surrounding the area where over 63 percent of the world's oil reserves are located.

The annual report explores energy issues as they relate to Nebraska, the nation and the world. It places Nebraska in a national and international context, underscoring the state's untapped opportunities to develop resources and technology which will serve us well in the face of our growing energy vulnerability. It also underscores the fact that energy development can make a significant contribution to economic development. The challenge has always been with us. Our task is to meet it creatively and effectively.

During the last several years, Nebraska, like all other states, began to feel stirrings of unease about our renewed — and growing — reliance on imported resources to meet our energy needs. We also became aware of the effects of the global warming trend that threatens the environment. Energy is too vital to be taken for granted. Now, when supplies are abundant and prices are low, we must do all we can to identify options and develop policies and programs that will help Nebraska deal with an uncertain future.

This report describes the activities and accomplishments of the Nebraska Energy Office in the past year. It examines a wide variety of issues from energy development to conservation, from future energy planning to the role of energy in the state's economy. But the report is intended to be more than a record of what we have done. It is intended, also, to stimulate thinking about what can be done — what we have yet to do — before we can say we have met the challenge of ensuring Nebraska's energy future.

Gary Rex,
Director

NEBRASKA IN PERSPECTIVE: THE UNMET CHALLENGE

Nebraska's primary energy goal is to reduce its dependence on imported resources to meet its energy needs – and to reduce the amount of money the state spends on energy. In 1987, Nebraska imported 80 to 90 percent of its energy resources, at a cost equivalent to almost 10 percent of our gross state product. A future energy crisis would mean serious social and economic consequences for Nebraska.

ENERGY CONSERVATION AND EFFICIENCY

Efficiency has proven to be one of America's most valuable resources. Since 1973, when oil price shocks sent Americans searching for ways to decrease energy consumption, the world has saved more energy through efficiency and conservation than it has gained from all new energy supplies. Now, instead of scaling back conservation efforts, we should be using this interlude of abundant energy sources and low prices to improve energy efficiency – not only to conserve energy, but to lower fuel bills and make money available to spend in other areas.

In 1986, Japan used only 4 percent of its gross national product to pay for energy, compared to U.S. energy expenditures of 10 percent of GNP. If America used energy as efficiently as Japan does, we could lower our national annual fuel bill by \$200 billion. What better example is there that investment in efficiency provides a better return than investment in energy supplies?

NEBRASKA'S PROGRESS IN ENERGY EFFICIENCY

In 1987, state- and federally-funded energy efficiency programs have saved Nebraska an estimated 3.6 trillion Btus or \$16.1 million. (A Btu, or British thermal unit is a measure of heat contained in a fuel. There are 125,000 Btus in a gallon of gasoline, 5.8 million Btus in a barrel of oil and 994,000 Btus in a thousand cubic feet of natural gas.) The Energy Office continues to work with Nebraskans to meet the challenge of using energy efficiently to operate buildings, propel vehicles and run home appliances.

Buildings

Nebraska has made significant progress in making the state's public and institutional buildings more energy-efficient. Through the federally-funded Institutional Conservation Program (ICP), more than \$7 million has been distributed to make energy improvements in Nebraska's hospitals and schools. The program has resulted in an estimated annual savings of over 800 billion Btus, or about \$3.6 million. (For more information about ICP, see page 43.)

Nebraska has exhibited a clear dedication to energy efficiency in buildings, most notably through the School Weatherization Program, the nation's first state-funded, ongoing program to weatherize public schools. The program began in 1981 by giving grants to participating schools; presently, it

operates as a no-interest loan program. The School Weatherization Program has produced an annual energy savings of approximately 1.1 trillion Btus and annual cost savings of over \$4.7 million. (See page 40 for a description of the School Weatherization Program's 1987-88 activity.)

During 1986-87, the Energy Office developed the Nebraska Public Buildings Energy Program under a grant from the U.S. Department of Energy. The project resulted in program and financing options for increasing energy efficiency in city and county buildings, schools, hospitals, long-term care facilities and state-owned buildings. (For a more detailed account of the Tier I Project, see page 28.)

Transportation

In 1985, new cars in the United States averaged 25 miles per gallon (mpg) – an improvement of 92 percent over the 13 mpg fuel efficiency in 1973. In the same period, cars in other

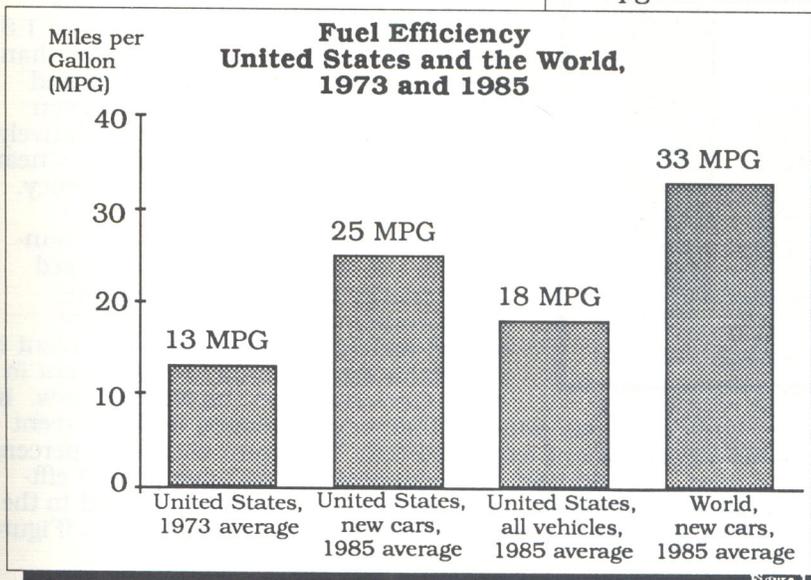
countries showed fuel efficiency improvements ranging from seven to 48 percent, with new cars averaging 30 to 33 mpg. Although American cars nearly doubled their fuel economy since 1973, they still are an average 17 percent less efficient than cars in other countries. Currently, the overall fuel efficiency of all cars in the United States – a mixture of old and new – is 18 mpg (Figure 1).

The gradually increasing fuel efficiency of new passenger automobiles has been offset in Nebraska by the increased speed limit on rural interstates and increased miles driven. Studies have shown that raising speed limits from 55 to 65 miles per hour reduces a car's fuel efficiency by about 13 percent. The implications of higher speed limits in Nebraska are clear: consumers will need an additional 12

to 14 million gallons of fuel for rural interstate travel each year. Even though Nebraskans won't be using as much fuel as they would if auto efficiency had remained at 1973 levels, higher speed limits and relatively low prices for gasoline will affect motorists' behavior. They may drive farther and more often, or may trade in their fuel-efficient cars for less efficient light trucks. At any rate, fuel efficiency is likely to remain a lower priority for consumers than it has in previous years.

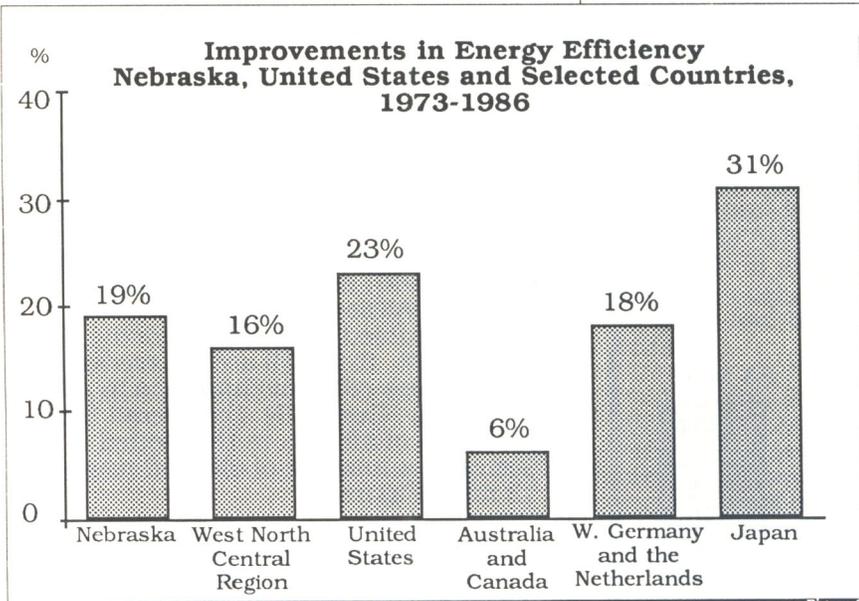
Appliance Efficiency

Recent technological developments that reduce the energy used by residential appliances will dramatically affect energy consumption in the future. As Nebraskans replace current appliances with new energy efficient models, the energy required to operate them will decrease, reducing proportionately the cost of operating them. For example, a new energy-efficient refrigerator uses an average 400 fewer kilowatt-hours per year than a less efficient older model. At the highest savings range, an energy-efficient refrigerator could save its owner as much as 87 percent of present operating costs.



ENERGY EFFICIENCY IN CONTEXT: NEBRASKA, THE NATION AND THE WORLD

Energy efficiency in the United States increased by 26 percent between 1973 and 1986. The ratio of Btus of energy consumed per dollar of Gross National Product (expressed in dollars of 1982 buying power) decreased during that period from 27,100 to 20,000. By comparison, in 1986 Nebraska consumed 21,000 Btus for every dollar of Gross State Product (GSP) – achieving a 19 percent increase in energy efficiency since 1973. 1986 energy consumption in the West North Central Census Region (a seven-state region of which Nebraska is a part) averaged 21,500 Btus per dollar of GSP – a 16 percent improvement in efficiency since 1973.



In contrast to other nations, the United States uses almost twice the energy per dollar of GNP than does Japan or West Germany and 1.4 to 1.8 times more energy per GNP dollar than Australia, Italy, the Netherlands and the United Kingdom. However, even though consumption remains relatively high in the U.S., this nation ranks near the top in increased energy efficiency.

Between 1973 and 1985, all countries in the world gradually changed their energy use patterns, but the improvements in energy efficiency varied widely – from about 6 percent in Australia and Canada to 18 percent in West Germany and the Netherlands. In

the United States, energy efficiency increased by 23 percent – an improvement exceeded only by Japan with a 31 percent increase. In addition, the economic gains have proven efficiency to be an even wiser investment when compared to the costs of exploring for fossil fuels like oil or natural gas (Figure 2).

The Potential for Energy Savings

Simply by using existing energy conservation technologies, we can reduce energy consumption and save money.

Efficiency improvements have come about largely unnoticed in the past fifteen years – the result of shifts in the economy and technological advances, not just lower thermostat settings and more fuel-efficient cars. Higher energy prices have forced managers, engineers and consumers to change the ways they operate and to apply new technologies. By tapping the technological potential to improve energy efficiency, we can continue to reduce energy consumption – without freezing in the dark.

What these last fifteen years have shown us is that we have options where none existed before – better choices among new and more economical appliances and vehicles, better choices for energy management in buildings and factories, better choices for improvement and cost-effective investment in energy efficiency in business and industry. Energy efficiency doesn't mean doing without – it means getting the same or better service from less energy, by taking advantage of technological creativity and ingenuity.

ELECTRICAL POWER SUPPLY

In spite of the promise that efficiency has shown, some power-supply forecasters are predicting that in the next five years shortages of electrical power will occur in certain areas of the United States, hindering economic growth and inconveniencing millions of Americans.

Efforts to conserve oil have led to more widespread use of electricity in manufacturing processes, making U.S. industry more efficient and globally competitive. However, utilities have been reluctant, in spite of growing demand for electricity, to build more power plants. The unrelenting heat of the summer of 1988 increased the peak demand for electricity and highlighted the potential crisis in electric power supply facing some parts of the United States. Forecasters predict that in the next few years some states, especially in the South Central, Middle Atlantic and New England regions, will not have enough power to meet demands for electricity during peak summer usage periods.

Nebraska is an exception to the power shortage prediction. Every year since 1974 (except for 1985), Nebraska has exported electricity. But we should not become too complacent about our ability to produce more than enough electricity to meet the demand in the state. Nebraska, which is the only state in the nation whose electrical utility companies are publicly-owned, can look upon its surplus electrical power as an opportunity for economic growth. However, awareness of the potential for crisis in electric power supply should keep Nebraskans open to ways of ensuring an adequate capacity for dealing with future electrical power needs.

ENERGY SECURITY: NEBRASKA AND THE NATION

In the last two years, the United States has been forced to look more closely at its growing energy vulnerability. Many factors combine to increase concerns about the nation's — and Nebraska's — energy security.

- The oil price collapse in 1986 devastated part of the U.S. oil industry, reducing domestic oil production by about one million barrels per day.
- The Chernobyl disaster raised serious questions about the safety of nuclear power.
- The effects of increased coal usage on the environment — from acid rain to global climate changes — are cause for growing concern.
- The future of our nation's electrical power supply is uncertain and demand for electric power continues to rise faster than new capacity is being added.
- Demand for oil is rising while domestic production of oil continues to drop.
- The U.S. transportation sector is using 20 percent more oil than it did in 1974.

Overriding all of these issues, however, is the fact that oil imports now account for more than 40 percent of the U.S. oil supply. Forecasters predict that if oil prices remain low, the U.S. could import more than 60 percent of its oil by 1995 —

and that, by then, half of the world's oil will come from the Persian Gulf. Such a scenario raises urgent questions about the nation's energy security. The political turmoil in the Persian Gulf serves as an unsettling reminder that energy policy, on both the state and national levels, must recognize that rising energy imports are increasing the nation's vulnerability to an energy supply disruption.

As we have learned in the past, there is no single solution to our energy problems. But preparedness in the face of potential crisis can be one of our strongest weapons. Therefore, we must develop options that will serve us in the event our energy security is breached. Organizations such as the National Association of State Energy Officials and the National Governors' Association have studied the issue of energy security and have offered a variety of alternatives:

- Take action to reduce U.S. dependence on foreign oil and gain more control over energy affairs.
- Increase exploration for oil and natural gas resources.
- Increase use of other domestic fuels, such as coal and uranium.
- Explore the potential of renewable energy options.
- Encourage greater implementation of clean coal technologies.
- Initiate regulatory reforms that increase the reliability of our electric power systems.
- Develop programs that encourage conservation and energy efficiency.

By choosing to develop domestic energy resources, to conserve energy through increased efficiency and to rely less on oil imports, we can reduce our potential vulnerability to sudden disruptions in our oil supply. Nebraska, like all other states, is in a strong position to develop programs and practices that would increase energy security and strengthen our economy.

GLOBAL WARMING

A growing body of evidence indicates that gases from fossil-fuel combustion may contribute to a significant rise in global temperatures over the next century. Gaseous pollutants – carbon dioxide, methane, nitrous oxide and fluorocarbons – rise from the earth's surface to create a shield in the upper atmosphere. Heat from the sun can penetrate the shield, but cannot radiate through the shield back into space. As a result, heat is reflected again onto the earth's surface, causing a "greenhouse effect." As the earth's atmosphere gets warmer, changes in the global climate may lead to shifts in regional precipitation, growing seasons and sea levels.

The difficult challenge for policy makers is how to respond. If one gives any credence to the predictions, then it is clear that some action is essential long before we can be certain of the extent of future damage and its timing. Waiting until we are certain that emissions are increasing global temperatures could result in an irreversible level of climate change.

Congress will soon consider legislation to set goals for reducing emissions, promoting energy efficiency, improving

nuclear power safety and production and increasing renewable energy research. Such actions can — in addition to reducing the greenhouse effect — reduce dependence on foreign oil, cut acid rain, create new forests and reduce soil erosion.

Opportunities for Nebraskans to help reduce the greenhouse effect are available in several areas:

- **Energy Efficiency.** Using less energy to provide the same services not only reduces global warming through a reduction in carbon dioxide emissions, it also reduces the production of air pollutants that cause acid rain, decreases our dependence on foreign oil and improves our balance of trade.
- **Fuel Switching.** Among fossil fuels there are enormous differences in the amount of emitted for each unit of energy produced. For example, coal releases about twice as much carbon dioxide as natural gas. Similarly, ethanol or compressed natural gas releases about half the of gasoline.
- **Renewable Energy Technologies.** Renewable resources are abundant, but often diffuse. Electricity generation by wind or sunlight is increasing. Electricity production from biomass and combustible solid waste is a growing industry. Solar and wind technologies have the advantage of producing no greenhouse gases, while biomass technology produces no more than it consumed during growth of the raw materials that produced them.
- **Reassess the Nuclear Option.** Nuclear power does have the advantage of not producing any greenhouse gases in the production of electricity. Congress will soon consider legislation to provide funding for research and development of a new generation of nuclear reactors which would be safer and more cost-effective.

Although Nebraska alone cannot turn around the devastating effects of a gradual climate change, we can contribute to the solution. None of the means of countering global warming are beyond our capabilities, initiative and concerted efforts to promote energy planning and efficiency.

TURNING CHALLENGE TO OPPORTUNITY

Energy will always be of serious concern to Nebraska. The challenge facing us, although simple in nature, is much more complex in its resolution. Our reliance on external sources for energy supplies makes us highly vulnerable to energy supply disruptions, especially in light of the still unpredictable Persian Gulf situation. We must pursue energy policies and practices that help ensure our energy future. In addition, we also must find ways to use energy to foster a strong economy and to preserve the environment.

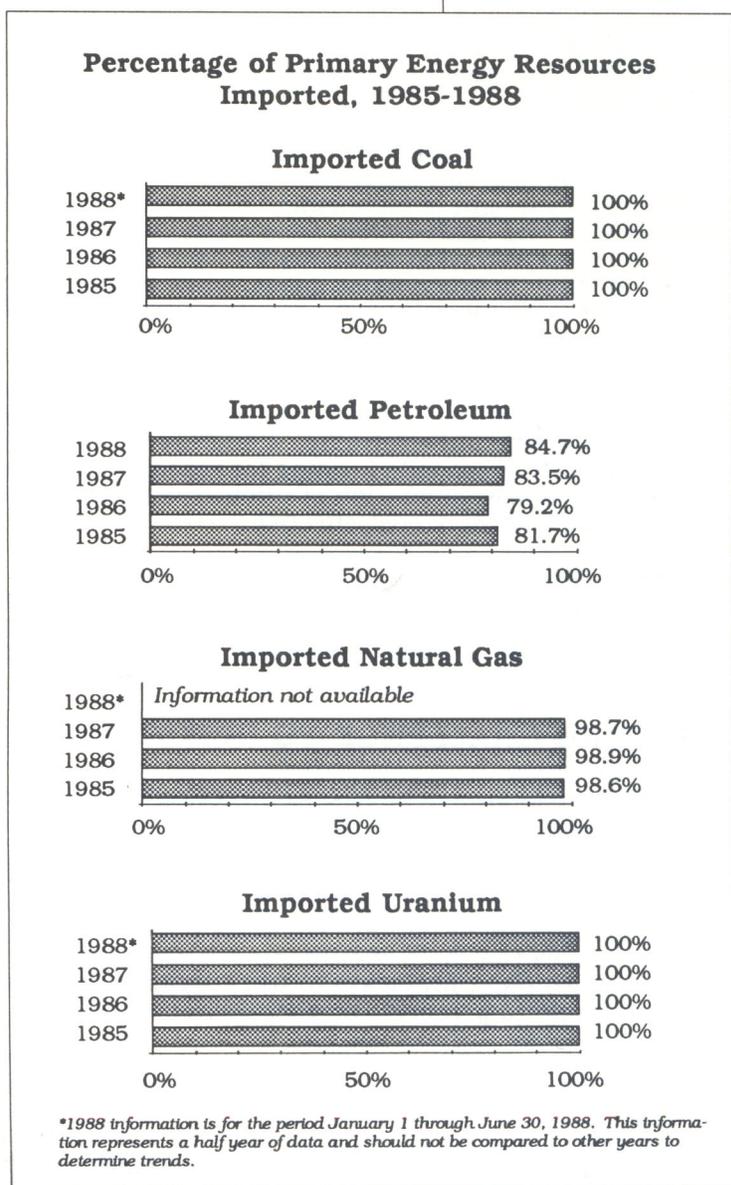
The Nebraska Energy Office continues to work toward these goals — to make the most of opportunities that allow us *to meet and resolve the challenge*. *This annual report* describes the efforts of the Energy Office in 1987-88 to encourage development of reliable energy technologies, to disseminate information about efficient energy practices, to explore new ways of financing energy projects, to nurture partnerships that promote energy efficiency and to plan for a more efficient and cost-effective energy future.

ENERGY INFORMATION

NEBRASKA'S ENERGY RESOURCES

Energy Imports

To keep pace with technological change and to meet its primary energy needs, Nebraska continues to rely on others to supply most of its energy resources. Currently, 80 to 90 percent of the state's energy resources come from outside Nebraska. Figure 3 illustrates the current level of dependence for primary sources of energy — coal, petroleum, natural gas and uranium.



Coal

During 1987 and the first half of 1988, Nebraska imported 100 percent of the coal required to generate electricity for its energy consumers. These coal supplies — approximately 6.7 million short tons in 1987 — came chiefly from Wyoming.

Petroleum

Nebraskans imported about 83.5 percent of their petroleum needs in 1987 and about 84.7 percent in the first half of 1988. However, all petroleum products actually used in the state were imported since there are no refining facilities in the state and all crude oil production (16.5 percent of consumption in 1987 and 15.3 percent in the first half of 1988) is exported for refining outside Nebraska.

Natural Gas

Nebraskans depended on imports to meet 98.7 percent of their natural gas needs in 1987. These imports — totaling almost 96 billion cubic feet — were provided mainly through pipelines operated by Northern Natural Gas Company and KN Energy. Natural Gas data are not available for the first half of 1988. However, natural gas imports for 1988 are likely to be consistent with 1987 levels.

Uranium

Even though uranium is mined in the Nebraska panhandle, it must be shipped elsewhere for processing. Therefore the state imports 100 percent of the nuclear fuel used to power its two nuclear power plants.

Source: '81-'86 U.S. Department of Energy
'87-'88 Nebraska Energy Office
Preliminary

Alternative Energy Sources

Alternative sources of energy, generally classified as renewable, include: ethanol, solar, wind power and wood (including other biomasses).

In 1987, Nebraska produced about 11.1 million gallons of ethanol accounting for 49 percent of the ethanol used to produce gasohol in the state. The state imported the remaining 11.5 million gallons of ethanol. 227 million gallons of gasohol — a blend of 90 percent gasoline and 10 percent ethanol, (agricultural ethyl alcohol) — were blended in Nebraska in 1987, an increase of 17 percent over the number of gallons blended in 1986. During the first half of 1988, 118.5 million gallons were blended, a 21 percent increase over the first half of 1987. Total gasohol consumption was 242 million gallons in 1987 and 126 million gallons for the first half of 1988 (up 7.6 percent from the first half of 1987). Ethanol use during the period, however, accounted for only 0.5 percent of Nebraska's total energy consumption.

Other alternative fuel sources — solar, wind and wood — contribute less than one percent to Nebraska's energy needs.

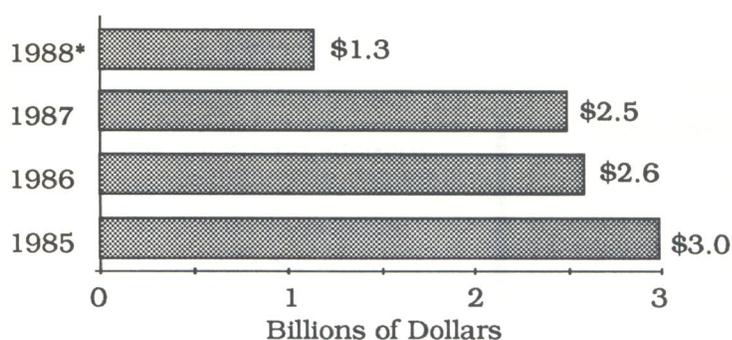
Costs

As Figure 4 shows, the cost of energy supplies continued to decrease from a high of \$3 billion in 1985. Energy expenditures in 1987 were approximately \$2.5 billion, down 0.3 percent from 1986. Per capita expenditures decreased from \$1,597 in 1986 to \$1,595 in 1987.

Figure 5 shows how Nebraska's 1987 and 1986 expenditures for energy compare. (Figures are in millions of dollars. Electricity expenditures are adjusted by expenditures for electric utilities.)

Several factors account for lower energy costs in the past three years: price decreases for petroleum products, natural gas, coal; less severe weather; and increased efficiency in all sectors. However, it is evident that the decline in energy expenditures is gradually diminishing. Industry experts say that lower prices for coal, petroleum and natural gas are likely only temporary and a return to higher prices is expected.

Costs of Energy, Nebraska, 1985-1988



*1988 information is for the period January 1 through June 30, 1988. This information represents a half year of data and should not be compared to other years to determine trends.

Source: '85-'86 U.S. Department of Energy
'87-'88 Nebraska Energy Office Preliminary

Figure 4

Comparison of Energy Expenditures, Nebraska, 1986-1987

(Millions of Dollars)

Resource	1987	1986	Difference in percent
Coal	\$114.6	\$119.7	- 4.3
Petroleum	1,257.9	1,224.3	+ 2.7
Natural Gas	349.9	408.7	- 14.4
Electricity	762.3	746.9	+ 2.1
Total	\$2,544.8	\$2,552.4	- 0.3

Source: '86 U.S. Department of Energy
'87 Nebraska Energy Office Preliminary

Figure 5

INDIGENOUS RESOURCES

Although Nebraska depends heavily on imports to meet its primary energy needs, the state does produce three traditional energy resources — petroleum, natural gas and hydroelectric power — and one non-traditional resource — efficiency. Current levels of these indigenous resources are shown in Figure 6.

Reserves

Petroleum

As of December 31, 1987, Nebraska's current oil reserves stood at 33 million barrels equal to approximately 90 percent of Nebraska's annual petroleum consumption. Based on the state's current consumption patterns, Nebraska has a 10.7 month supply of proven petroleum reserves given current consumption patterns.

Natural Gas

Because Nebraska's natural gas reserves are calculated with those of marginally producing states, specific data are unavailable.

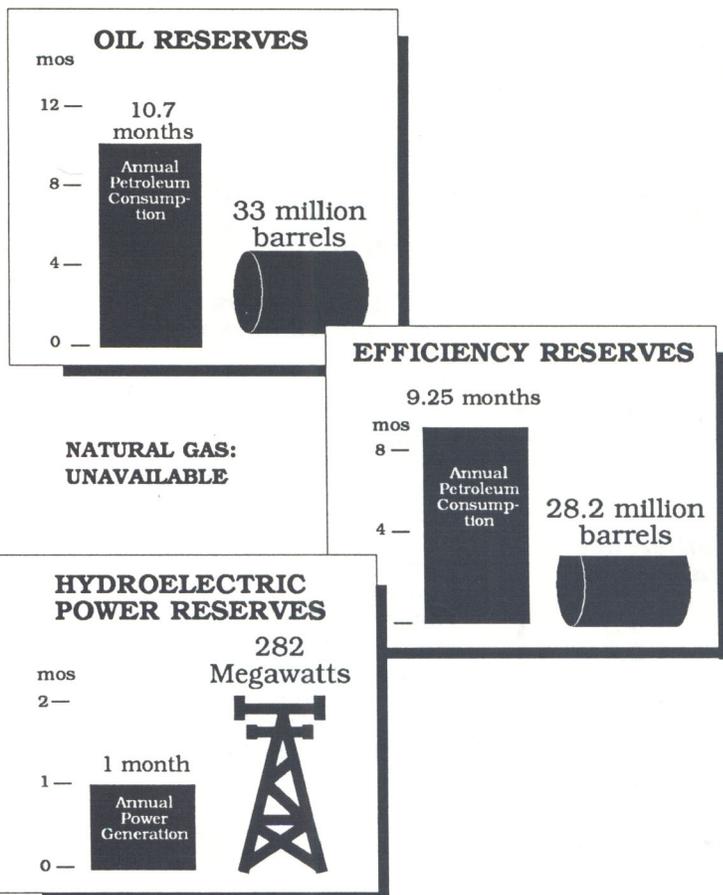
Efficiency

Using current technology, the potential savings from increased energy efficiency in Nebraska is equivalent to 28.2 million barrels of oil. This represents 77 percent of Nebraska's total 1987 oil consumption — and would provide petroleum for 9.25 months, based on current oil consumption rates.

Hydroelectric Power

Nebraska currently has 282 megawatts in hydroelectric power generating capacity. This represents only 4.8 percent of the state's electric generating capacity. Hydroelectric power ac-

**Reserves of Indigenous Resources in Nebraska
December, 1987**



Source: Nebraska Energy Office

Figure 6

Hydroelectric Power: Electricity generated by an electric power plant whose turbines are driven by falling water.

counted for 7.7 percent of all electric power generated in Nebraska in 1987 and for 7.5 percent in the first half of 1988.

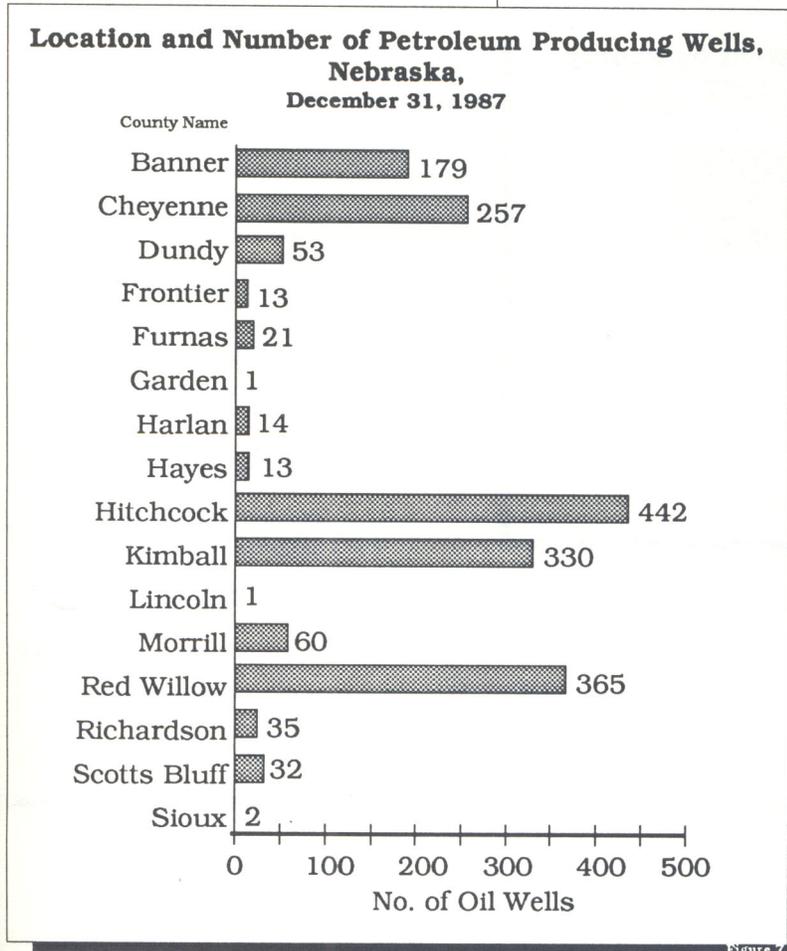
Production

Petroleum

Nebraska wells produced only 6,090,931 barrels of petroleum during 1987 — a decrease of 14.2 percent from 1986 production of over 7 million barrels. Petroleum production in Nebraska peaked at 25 million barrels in 1962. Since then, however, production has dropped dramatically — and 1987 production levels were the lowest since 1979. Production for the first half of 1988 totaled 2,876,025 barrels, or 93.5 percent of production in the same period in 1987.

The amount of petroleum produced in Nebraska constituted 16.5 percent of that consumed here in 1987 and 15.3 percent of that consumed in the first half of 1988. All petroleum produced in the state is exported to refineries.

More drilling permits were issued during 1987 than in 1986, but were still far fewer than the number issued each year from 1975 through 1985. As of December 31, 1987, there were 1,818 producing wells in Nebraska. Figure 7 identifies the location and number of producing wells in Nebraska as of December 31, 1987.



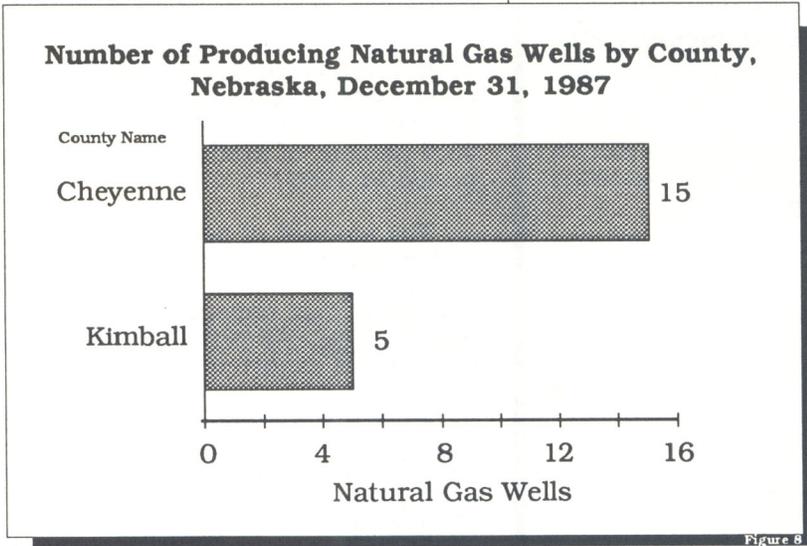
Source: Nebraska Oil and Gas Commission

Figure 7

Natural Gas

Nebraska produced only about 1.3 percent of the natural gas used by the state's energy consumers in 1987. Total production amounted to 1,260,540 thousand cubic feet — a decrease of 10.2 percent from 1986 production levels of 1,403,485 cubic feet. 1987 production was the lowest reported in Nebraska since natural gas production amounts were first recorded in 1950. Natural gas production data for the first six months of 1988 are not available.

Figure 8 shows the number of currently active natural gas wells in Nebraska and their locations by county.



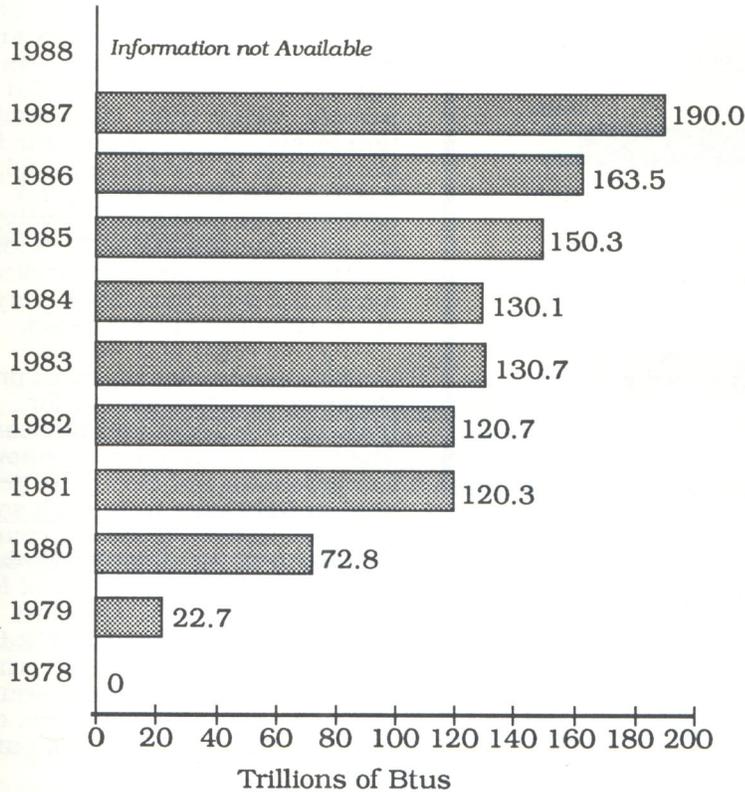
Source: Nebraska Oil and Gas Commission

Figure 8

Energy Efficiency

Energy efficiency has proven to be a valuable, non-traditional resource that Nebraskans – who are heavily dependent on outside energy sources – can use to make current energy supplies go farther and to reduce energy costs. Figure 9 shows estimated energy savings due to efficiency and conservation based on historical consumption patterns. By adapting new energy-efficient technologies and expanding efforts to adopt energy efficiency strategies in all sectors, Nebraskans can reduce current levels of energy consumption even more.

Estimated Energy Saved Through Efficiency, Nebraska, 1978-1987
(trillion Btus)



Source: Nebraska Energy Office Estimates

Figure 9

Electrical Generation

Nebraska's electrical needs are served by 156 publicly-owned electric utility companies. The Nebraska Public Power District and the Omaha Public Power District are the state's major utility companies. In addition, two out-of-state concerns sell electricity to Nebraska's rural power districts: Western Area Power Administration and Tri-State Generation and Transmission. Nebraska also is part of the Mid Continent Area Power Pool, a consortium of utilities in seven states that buy and sell power cooperatively.

Nebraska's Electric Generating Capacity by Energy Source, 1987



Nebraska's Electric Power Generation by Source, 1987



Figure 10

Sources: *Inventory of Power Plants in the U.S., 1987*
Electric Power Annual. U.S. Department of Energy

In 1987, generation of electricity in Nebraska reached an all-time high of 20,489 gigawatt-hours (million kilowatt-hours) — 8.8 percent higher than 1986 production levels. Production in the first six months of 1988 amounted to 9,376 gigawatt-hours, up 2.4 percent over production levels in the same period in 1987. Nebraska continued to export excess electricity, as the state has done every year since 1974 (except for 1985).

Nebraska relies on three primary types of electrical generation: hydroelectric, coal and nuclear. The bar graph (Figure 10) shows the percentage of electricity generated in Nebraska from each source. The pie charts (Figure 11) compare Nebraska to the West North Central Census Region (consisting of Iowa, Kansas, Minnesota, Missouri, Nebraska and North and South Dakota) and to the nation in terms of the amount of electrical power generated by coal, hydroelectric, oil and gas, nuclear generation and other.

Electric Power Generation by Source in Nebraska, West North Central Region and U.S., 1987

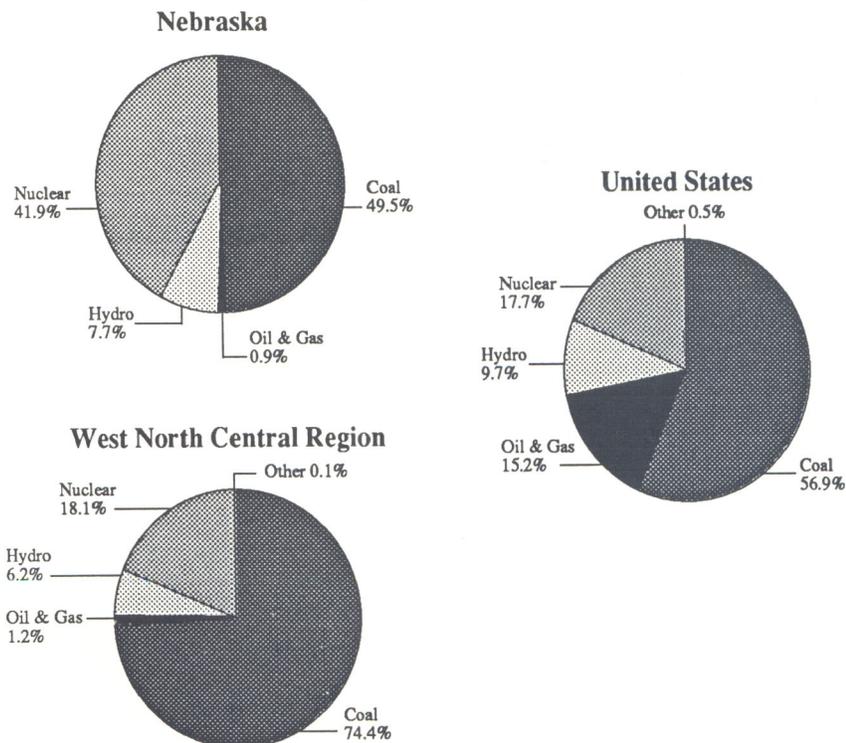
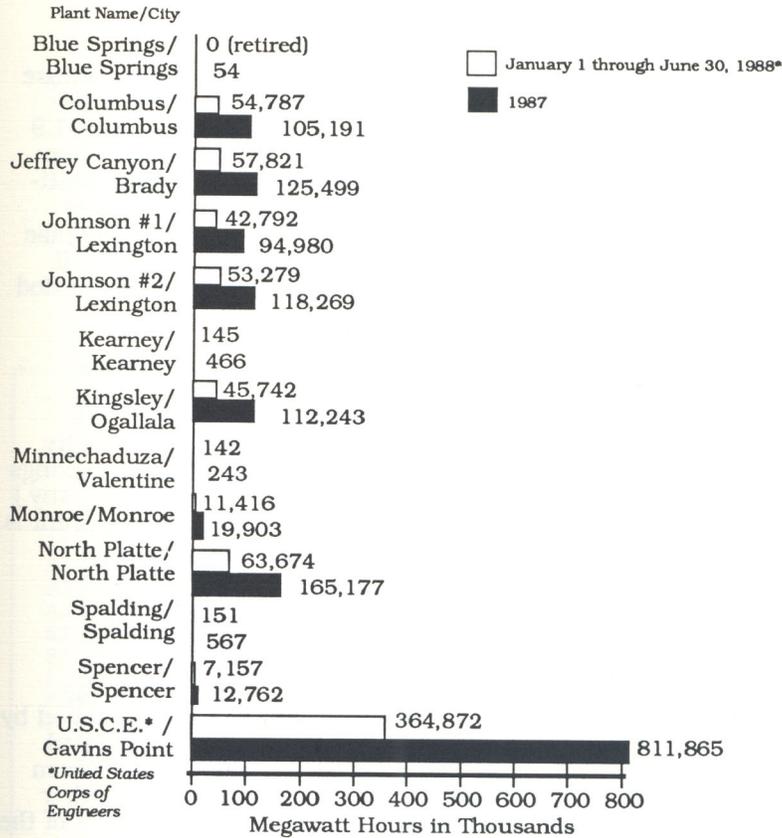


Figure 11

Sources: *Electric Power Monthly*
U.S. Department of Energy

Hydroelectric Plants by Location, 1987-88 Production

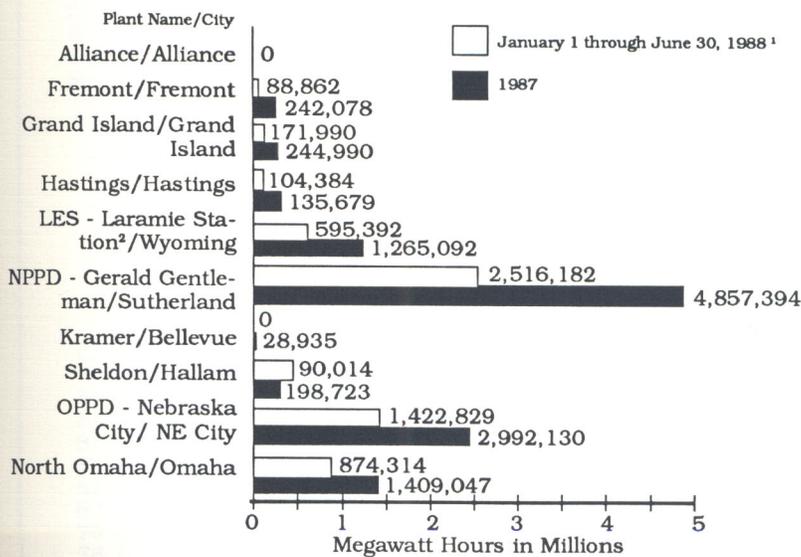


*1988 information is for the period January 1 through June 30, 1988. This information represents a half year of data and should not be compared to other years to determine trends.

Source: U.S. Department of Energy

Figure 12

Coal-Fired Electrical Generating Plants by Location, 1987-88 Production



¹1988 information is for the period January 1 through June 30, 1988. This information represents a half year of data and should not be compared to other years to determine trends.

² Figure represents 13.13 percent of facility owned by Lincoln Electric System plant located in Wyoming

Source: U.S. Department of Energy

Figure 13

Nebraska has twelve operating hydroelectric plants. NPPD's Blue Springs plant was retired in early 1988. Figure 12 identifies the plants, their locations and their production in megawatt-hours (one thousand kilowatt-hours) for 1987 and the first half of 1988.

Coal

Coal generation provides the largest amount of electricity in Nebraska. In 1987, coal supplied 49.5 percent of the power generated in the state, or 10,152 gigawatt-hours. Although this figure was 8.9 percent higher than total coal-generated power in 1986, it still falls below 1984 and 1985 levels. In the first half of 1988, however, coal generation accounted for 60.3 percent of the total amount of electricity produced in Nebraska, up 16.2 percent over the same period in 1987.

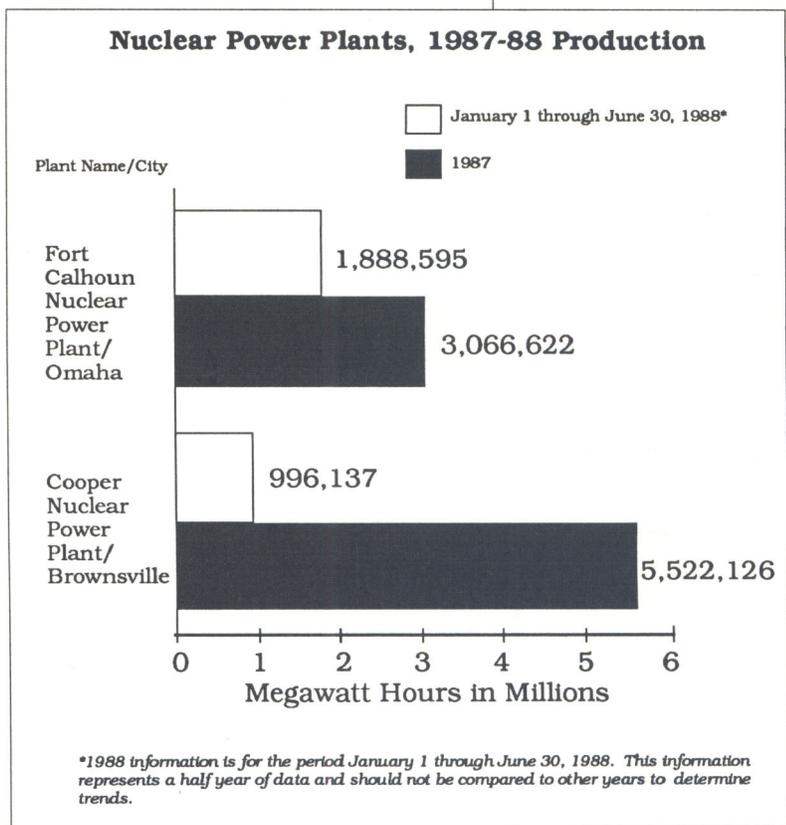
Nebraska's publicly-owned utilities operate nine coal-fired electrical generating stations (NPPD's Kramer plant closed in 1987). The plants, their locations and their production for 1987 and the first half of 1988 are listed in Figure 13.

In 1987 and the first six months of 1988, approximately 97 percent of the coal used to generate electricity in Nebraska's coal-fired plants came from Wyoming. This coal was primarily of low sulfur content. In fact, 98.3 percent of all coal used in Nebraska's generating plants contained less than 0.5 percent sulfur. Only 42.5 percent of the coal used regionally and 23.8 percent of coal used nationally is that clean. Low sulfur coal burns cleanly and is less likely to lead to acid rain and the formation of other environmental pollutants.

Nuclear

Nuclear-generated electricity is produced in plants whose turbines are driven by steam that is heated by nuclear fission. In 1987, nuclear power generation accounted for 41.9 percent of the electrical power generated in Nebraska — an increase of 12.2 percent over 1986 levels, to 8,589 gigawatt-hours. In the first half of 1988, nuclear-generated power amounted to 2,885 gigawatt-hours, a 30.8 percent decrease from the total produced in the first six months of 1987. It should be noted, however, that production during this period was affected by scheduled maintenance.

Nebraska has two nuclear power plants: the Omaha Public Power District's Fort Calhoun Station and the Nebraska Public Power District's Cooper Station. (Note: By contract, 50 percent of the electricity produced at the Cooper Station belongs to the Iowa Power and Light Company.) Production information for each plant is included in Figure 14.



Source: U.S. Department of Energy

Figure 14

Other Sources of Electrical Generation

In 1987, only 0.9 percent of the state's electrical power was produced by methods requiring the use of oil and gas. This figure is down slightly from 1986. In the first half of 1988, other sources accounted for 1.4 percent of the total electricity produced in Nebraska.

ENERGY USE

Total energy consumption figures in this report refer to total primary energy consumption (consumption not adjusted for associated energy loss) less interstate electricity sales. Consumption figures for all types of energy are presented in Btus (British Thermal Units) to facilitate comparisons.

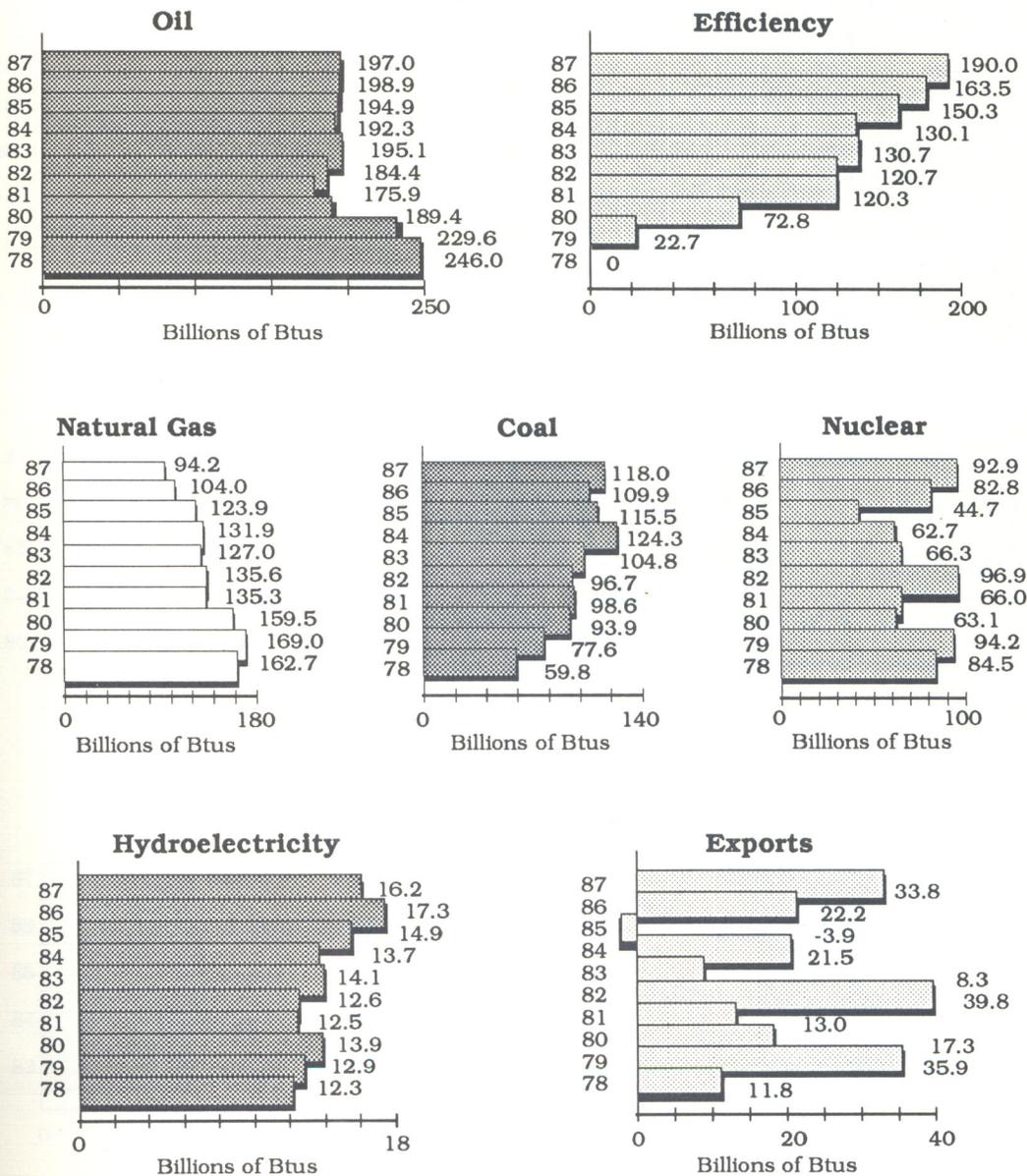
In 1987, Nebraskans used a total of 484.5 trillion Btus of energy — a 0.9 percent decrease in energy consumption from 1986 consumption levels. Petroleum use remained nearly the same, use of natural gas decreased 9.4 percent, coal use increased 7.4 percent, nuclear power use increased 12.2 percent and hydroelectric power use decreased 6.4 percent (Figure 15).

Per capita consumption of energy in Nebraska declined by 0.7 percent in 1987, to 303.8 million Btus. In addition, Nebraska's per capita consumption was nearly 3 percent less than the 312.3 million Btu per capita national average.

Volume of Energy Use by Fuel Type, Nebraska, 1978-1987

(billion Btus)

1988 Information Not Available



Source: U.S. Department of Energy 1978-1986
Nebraska Energy Office 1987

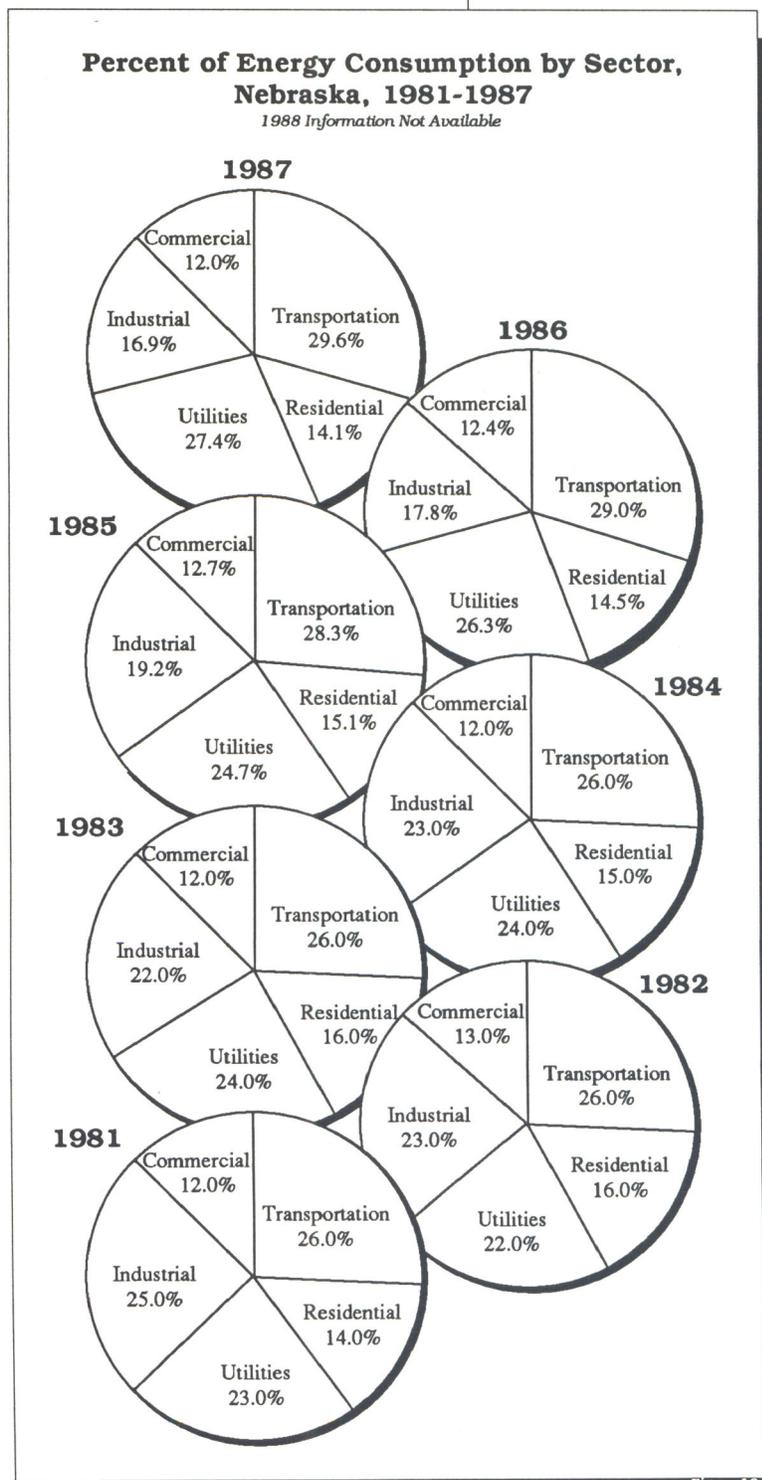
Figure 15

Definition:

Btu: A measure of heat contained in a fuel. It is roughly equal to the amount of heat generated by the complete burning of an ordinary wooden kitchen match. For reference, there are 3,413 Btus in each kilowatt-hour of electricity that is purchased; 124,950 Btus in a gallon of gasoline; and 994,000 Btus in each thousand cubic feet (MCF) of natural gas.

Use by Sector

Energy consumption in the state is grouped by five sectors: Transportation, Residential, Utilities, Industrial (including Agriculture) and Commercial (including Government). Figure 16 illustrates current and historical energy use from 1981 through December of 1987. It shows the percentage of energy consumption for each sector each year.



Source: '81-'86 U.S. Department of Energy
 '87 Nebraska Energy Office

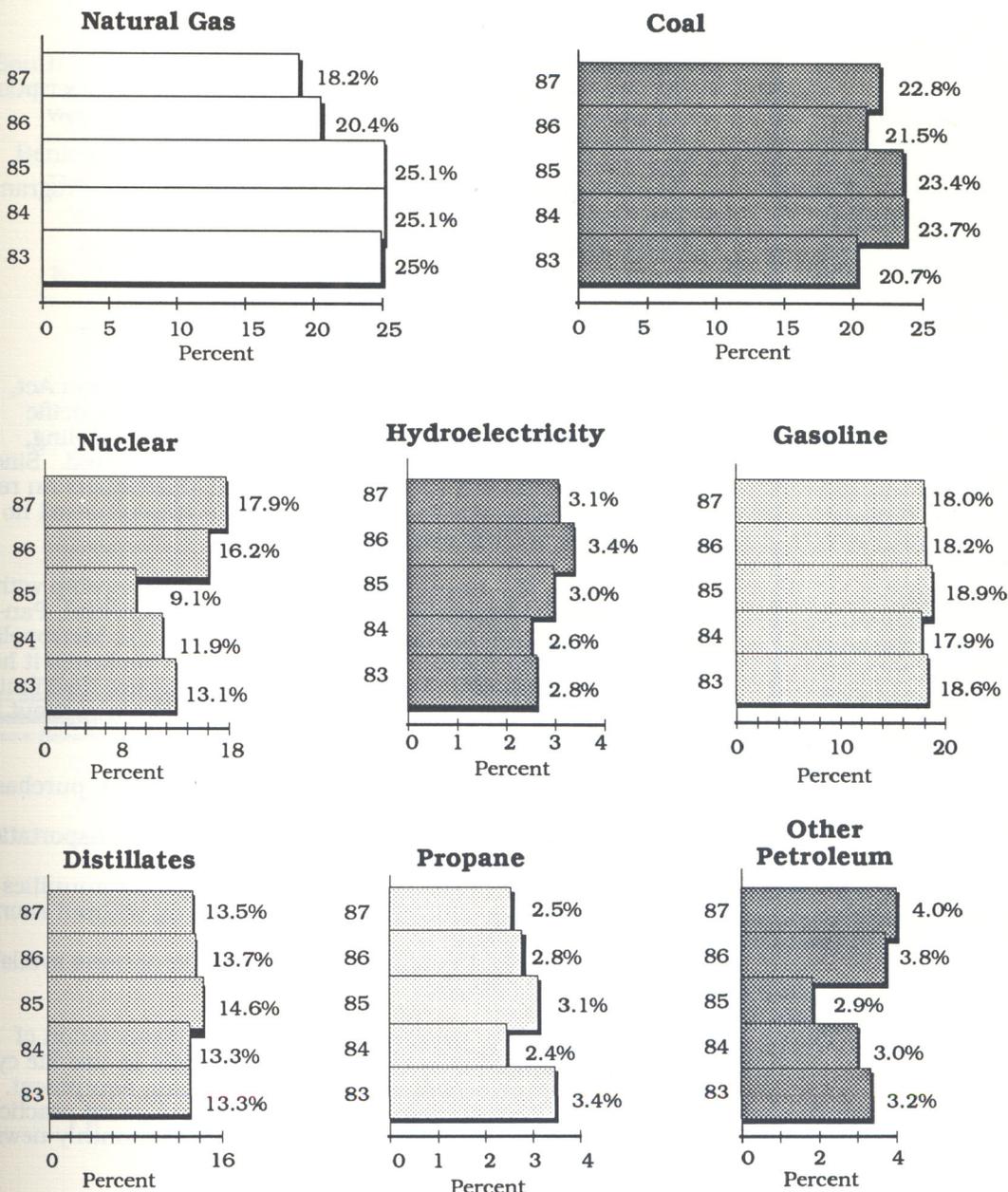
Figure 16

Use by Fuel Type

Figure 17 illustrates consumption trends by five fuel types: natural gas, coal, nuclear, hydroelectric and petroleum, which is subdivided into four basic fuels: gasoline, distillates, propane and other petroleum. Figure 17 also shows percentage of total consumption of each type of resource by year from 1983 through 1987.

Percentage of Energy Use by Fuel Type, Nebraska, 1983-1987

1988 Information Not Available



Definitions:

Coal: Includes all types of coal—anthracite, bituminous, subbituminous and lignite. Almost all of the coal used is for electrical power generation.

Distillates: Light fuel oils distilled during the refining process and used primarily for space heating, on and off highway diesel engine fuel (including railroad engine fuel and fuel of agricultural machinery) and electrical power generation.

Propane: A normally gaseous, paraffinic hydrocarbon that is extracted from natural gas or refinery gas streams. Propane is used primarily for residential and commercial heating and cooling, and also as a fuel for transportation. Industrial uses of propane include use as a petrochemical feedstock.

ENERGY PROJECTS DIVISION

The Nebraska Energy Office is responsible for administering two federally-funded programs created under the Energy Conservation Act of 1975: the State Energy Conservation Program (SECP) and the Energy Extension Service (EES). Both programs let the state use its discretion in providing energy conservation services, but the Energy Office must submit annual program plans to the U.S. Department of Energy.

The Energy Projects Division manages SECP and EES programs. In general, agency staff run the programs directly. In some cases, the agency may work closely with outside contractors hired to perform the work. In 1987-88, this Division was responsible for supervising:

- Federally Mandated Projects
- Oil Overcharge Projects (See page 29 for a full description of projects financed by Petroleum Violation Escrow Funds.)
- The Electrical Load Management Resource Fund
- The Nebraska Community Energy Management Program
- The Agricultural Energy Conservation Project
- Other projects and studies

FEDERALLY-MANDATED PROJECTS

According to the terms of the Energy Conservation Act, the Energy Office must undertake projects in the specific areas of equipment procurement, vanpooling/carpooling, lighting and thermal standards and right-turn-on-red. Since the Legislature passed legislation allowing right turns on red lights in Nebraska, the federal government has required no further action on this mandatory activity.

In 1987-88, the Energy Office formed a partnership with four Economic Development Districts – West Central, Panhandle Area, Southeast and Northeast – and the Metropolitan Area Planning Agency, to distribute four brochures it had developed in 1986-87. About 400 brochures were distributed to appropriate county and community officials throughout the state. The brochures dealt with:

- Life Cycle Costing, encouraging civic officials to purchase more efficient equipment.
- Transportation, highlighting energy-saving transportation options available to Nebraskans.
- Street and Park Lighting, describing ways communities can increase the efficiency of such lighting without sacrificing illumination.
- Building Codes, explaining building code options available to municipal officials.

In late 1987, the agency joined with the Association of Nebraska School Boards to encourage schools to use life cycle cost analysis in purchasing energy-consuming equipment. Four articles promoting energy-efficient purchasing practices have appeared or will appear in *School Board* monthly newsletters during 1988 and 1989.

ELECTRICAL LOAD MANAGEMENT RESOURCE FUND

In 1983, the Energy Office created the Electrical Load Management Resource Fund with a \$50,000 grant to the Nebraska Municipal Power Pool (NMPP). On May 29, 1987, the two agencies executed a new contract to replace Section 155 Warner Amendment funds with Exxon funds. The Fund offers interest-free financing to NMPP-member communities that own their own electrical systems to help them purchase load management systems. Load management systems allow utilities to reduce peak demand, thus saving energy and avoiding demand charges.

The Nebraska Municipal Power Pool made six loans in 1987 and the first half of 1988.

Callaway received \$14,000 in early 1987 to install a direct load management system with a total cost of \$25,500. Due to unexpected delays in receiving FCC radio licensing, the work wasn't completed until late summer. Even with the late start, however, the city reduced peak demand by 4.1 percent and saved \$5,000.

Wauneta received \$11,000 in early 1987 to install a direct load management system that cost a total of \$22,800. Because delays kept Wauneta from completing work until September, the city was unable to reduce peak demand in the 1987 season. In 1988, Wauneta saved \$5,700.

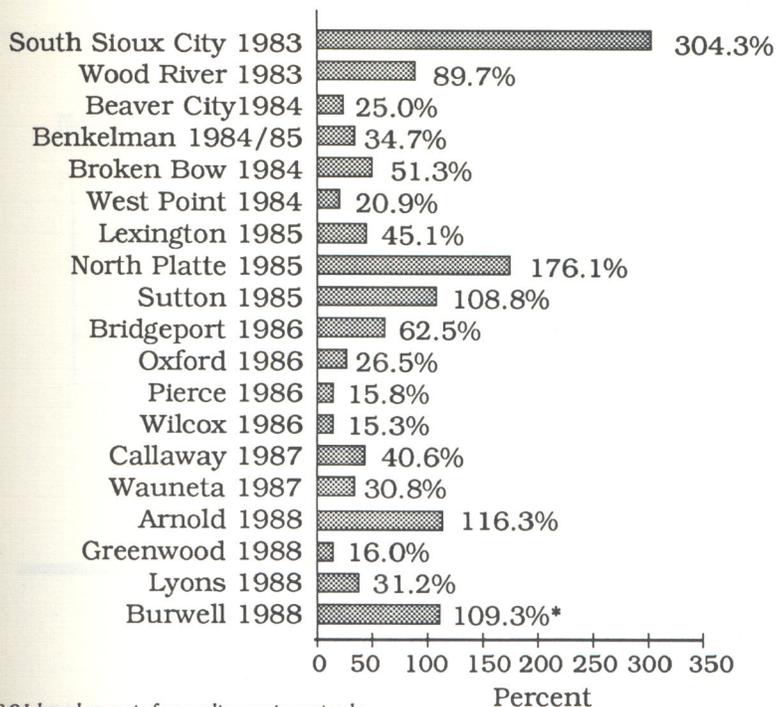
Arnold received \$14,000 toward installation of a \$23,200 direct load management system. Because of the extraordinarily hot summer of 1987, Arnold's peak demand increased, but only by 2 percent. At the same time, the city's energy sales increased by 6 percent. 1988 demand charge savings totaled \$27,000.

Greenwood received \$7,000 to install an indirect load management system with a total cost of \$16,000. Due to delays receiving equipment from the manufacturer, Greenwood did not complete installation of the system until after the peak load season. However, in the first six months of 1988, Greenwood saved \$2,400.

Lyons received \$2,000 to upgrade the load management equipment on the electrical distribution system. Total cost of the upgrade was \$2,000. Savings through 1988 totaled \$17,200.

Burwell received \$5,000 to upgrade the existing indirect load management system to a direct control system. Total cost of the upgrade is \$12,900. Burwell received its FCC

Electrical Load Management Return on Investment During the First Year by City January 1, 1983 Through June 30, 1988



*R.O.I. based on cost of upgrading equipment only.

Source: Nebraska Energy Office

Figure 18

radio license and began installation of the direct control system. 1988 demand charge savings from indirect load management systems totaled \$14,100.

First year return on investment data for all the loan recipients is illustrated in Figure 18. Communities that install load management systems will continue to earn additional savings during the lifetime of the equipment. However, the savings earned each year will fluctuate as the cost of demand charges change.

Since the Electrical Load Management Resource Fund began in 1983, the initial \$50,000 grant has recycled itself almost five times as the communities repay the no-interest loans. Total savings since 1983 have amounted to over \$2.5 million – a significant return on the state and local investment.

NEBRASKA COMMUNITY ENERGY MANAGEMENT PROGRAM

The Nebraska Community Energy Management Program began in 1982, serving twelve communities (shown in Figure 19): Allen, Bayard, Benson in Omaha, Burwell, Fremont, Lexington, Ravenna, Schuyler, South Sioux City, Verdigre, West Point and Wood River. Originally financed with oil overcharge funds, this program was eliminated in September 1986 when allocated funds ran out. Of the communities served, only Verdigre (the last to enter the program) reported any activity in 1987-88.

The Department of Economic Development approved Verdigre's request to use repayments on its commercial energy loans (funded by a Community Development Block Grant) to create a residential weatherization loan program. The Energy Office is still collecting information on that commercial loan program, which made \$258,000 available to finance energy efficiency improvements in more than 40 businesses in Verdigre. An evaluation report should be ready by mid-1989.

Nebraska Community Energy Management Cities

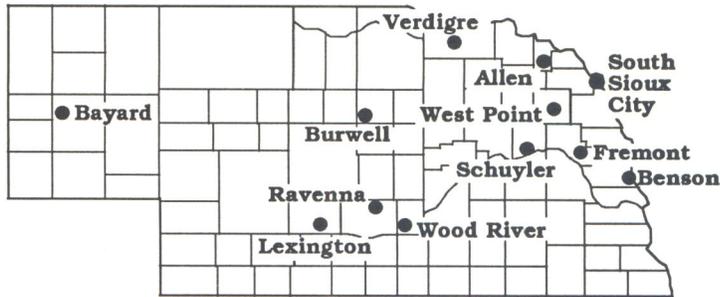


Figure 19

AGRICULTURAL ENERGY CONSERVATION PROJECT

In 1983, the Nebraska Energy Office, in conjunction with the University of Nebraska – Lincoln Cooperative Extension Service, began a five-year project designed to encourage efficient use of energy, water and soil in the agricultural sector. Funding for the project comes from a variety of sources, among them state oil overcharge funds, the University of Nebraska Foundation and accumulated interest.

Total financial support since the project began has amounted to \$1,208,800. Total expenditures have been \$1,090,695, leaving a balance in June 1988 of \$118,104.

Total fuel savings on this project will be available upon completion of the final report (in mid-1989). However, more than \$1 million has been saved in avoided energy costs to

date.

During 1987 and 1988, project activities have focused on three areas: conservation tillage, irrigation water management and ecofallow. Figure 20 illustrates the locations of the activities.

Conservation Tillage

Seven counties – Wayne, Thurston, Burt, Washington, Johnson, Saline and Gage – are involved in activities that promote conservation tillage, a highly cost-effective means of controlling soil erosion.

During the period from July 1, 1987, through June 30, 1988, 1,850 people attended 59 presentations or programs on conservation tillage. During some of

these presentations, a rainfall simulator was used to demonstrate the effectiveness of crop residue in slowing soil erosion. In addition, an in-depth training program on planters for conservation tillage and on methods of estimating residue cover was developed for the Soil Conservation Service.

Irrigation Water Management

This portion of the project is designed to improve irrigation management practices in Buffalo, Holt and Antelope counties.

During the 1987-88 period, the project made 483 contacts and reached 982 people through on-farm demonstrations, field tours, workshops, individual consultation, newsletters and other literature. In addition, 23 people attended 17 pumping plant performance tests.

Ecofallow

Winter wheat crop rotations in Cheyenne, Garden, Deuel, Keith, Perkins, Chase and Lincoln counties are the focus of the ecofallow portion of the Agricultural Energy Conservation

Agricultural Energy Conservation Projects by County

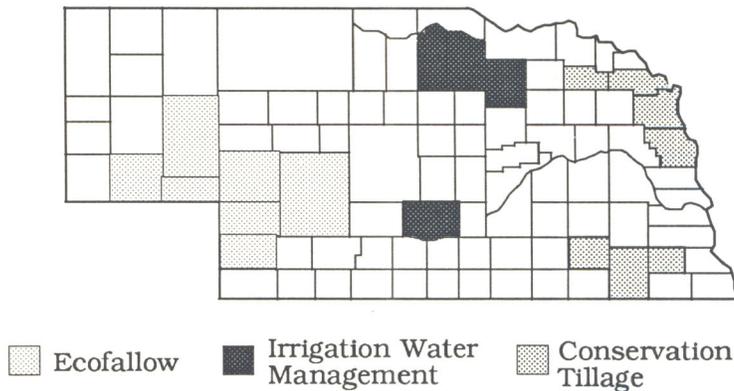


Figure 20

Project. Farmers are urged to use corn, sorghum or millet in rotation with wheat to increase yields without using irrigation.

During 1987-88, the project made 344 contacts that reached 1,707 people. Four newsletters were published, with a mailing list of 1,350. After wheat planting in the fall of 1987, every wheat field between Ogallala and Grant on Highway 61 (except center pivot-irrigated fields and corners) was tested for crop residue cover and soil moisture. Results were then compared to the ecofallow demonstration plot in the area. Most conventional fields had little residue cover and adequate moisture to depths of only 2.5 to 3.5 feet. The demonstration plot, by contrast, had 54 percent residue cover and adequate soil moisture to a depth of 6 feet.

OTHER PROJECTS AND STUDIES

Tier I

In 1986, the Nebraska Energy Office was awarded a Tier I planning grant through the Institutional Conservation Program (ICP) of the U.S. Department of Energy to develop a comprehensive program to increase energy efficiency in institutional sector buildings. The Energy Office developed the Nebraska Public Buildings Energy Program, which addresses the energy needs of hospitals, schools, local government buildings, state buildings, public care facilities and nonprofit institutions.

The Nebraska Public Buildings Energy Program is comprised of four components:

- Development of resource distribution activities including a resource library and computerized index, an energy calculation handbook and software, a counseling service and a marketing strategy.
- Development of networking activities including a computerized data bank of buildings, recognition awards and an outreach program to trade associations.
- Development of financing options through the efforts of a 23-member task force representing a cross-section of interests and areas of expertise from the institutional sections.
- Evaluation of the state-funded School Weatherization Program.

The programs developed under the Tier I grant reflect a comprehensive approach to addressing the energy needs in the public sector. It was specifically designed for Nebraska's public sector, but it has a universal application for all public institutions. Greater energy efficiency in buildings supported by public dollars makes sense for everyone.

The Report on the Tier I Project is anticipated to be available in February 1989.

PETROLEUM VIOLATION ESCROW FUNDS

Nebraska has been receiving oil overcharge funds since 1982, as a result of court actions against certain oil companies that overcharged their customers from 1973 through 1981 when federal price controls were in effect. The courts ordered the oil companies to distribute award money to the states to fund programs that provide indirect restitution to injured energy consumers. In 1987, the U.S. Department of Energy began a program of direct restitution to consumers who had been injured by the overcharges.

DIRECT RESTITUTION

Consumers who purchased oil products between August 13, 1973, and January 27, 1981, were eligible to apply for a share of the \$80 million set aside to provide direct restitution to those injured by overcharges. DOE established a refund standard of \$8 for each 10,000 gallons of petroleum products purchased during the overcharge period. The Energy Office provided information through newspaper, television and radio publicity detailing how and where to file claims with the Department of Energy before the December 31, 1987, deadline.

Nebraska led the nation with 5,711 refund claims, documenting purchases of 2.6 billion gallons of petroleum products and representing a total of \$2,080,000 in restitution payments.

As of June 30, 1988, DOE had approved 63 percent of the claims filed in Nebraska covering 555,679,753 gallons of petroleum products, or 22 percent of the total volume of documented purchases. Only four claims had been denied.

Initial refunds totaled slightly more than \$111,000, at a rate of \$2 per 10,000 gallons. Additional payments are expected to increase the awards for these claims to the \$8 per 10,000 gallon standard – or possibly higher as DOE collects additional overcharge funds.

The Energy Office filed a claim on behalf of the state government of Nebraska for purchases of 255,589,981 gallons of petroleum products. If DOE approves the claim, it will result in a \$204,000 refund to the state.

INDIRECT RESTITUTION

Because oil price control violations affected so many unidentified injured consumers, the courts distributed oil overcharge funds to the states on behalf of consumers. States

**Summary of Exxon, Stripper Well and Diamond Shamrock
Oil Overcharge Funds**

	Exxon	Stripper Well	Diamond	Total
Total Received	\$15,504,944	\$7,325,884	\$359,172	\$23,190,000
Interest Earned	2,558,156	790,742	46,351	3,395,249
Total 6-30-88	<u>\$18,063,100</u>	<u>\$8,116,626</u>	<u>\$405,523</u>	<u>\$26,585,249</u>
Less Budgeted:				
Contracts	\$3,697,779	\$0	\$0	\$3,697,779
Program Development	60,418	0	6,434	66,825
Monitoring/Evaluation	134,753	0	0	134,753
Education	26,829	0	0	26,829
Load Management	75,000	0	0	75,000
Attorney General Legal Fees	0	103,457	0	103,457
Low Income Weatherization	0	619,584	0	619,584
Oil Overcharge Administration	0	0	386,589	386,589
Direct Restitution Project	0	0	12,500	12,500
Subtotal 6-30-88	<u>\$3,994,779</u>	<u>\$723,041</u>	<u>\$405,523</u>	<u>\$5,123,343</u>
Uncommitted Balance 6-30-88	<u>\$14,068,321</u>	<u>\$7,393,585</u>	<u>\$0</u>	<u>\$21,461,906</u>

Figure 21

Source: Nebraska Energy Office

were directed to use the money, within parameters established by the courts, to fund energy assistance and conservation programs.

A summary of the *Exxon*, *Stripper Well* and *Diamond Shamrock* funds as of June 30, 1988, is illustrated in Figure 21.

\$5,000,000 in overcharge funds had originally been designated for use by the Nebraska Energy Fund, Inc. (NEFI). In 1987, however, DOE questioned the legality of using funds for NEFI. On May 17, 1988, the NEFI Board of Directors voted to dissolve the corporation.

Exxon Contracts

Exxon funds are used to finance projects that promote energy education and conservation. The Energy Projects Division administers the contracts under the State Energy Conservation Program and Energy Extension Service. Figure 22 lists expenditures by category of all *Exxon* funds through June 1988. Figure 23 on the following page indicates the groups that have been approved for *Exxon* grants and the types of projects they proposed.

Exxon Contracts		
Category	Contract Amount	Expenditures through 6-30-88
Energy Education	\$761,900	\$288,295
Financing Demonstrations	1,100,164	347,715
Agriculture	327,234	79,580
Feasibility Studies	155,720	54,594
Building Improvement Demonstration	852,761	64,548
Transportation	<u>\$500,000</u>	<u>\$450,000</u>
Total Exxon Contracts 6-30-88	<u>\$3,697,779</u>	<u>\$1,284,732</u>

Figure 22

Source: Nebraska Energy Office

Exxon Grant Projects by Category

Energy Education

Hoeger Communications	energy education videos
Management Information Resources	jr. high education program
Nebraska Council on Economic Education	state-wide education
Central Community College	auto efficiency training
Auburn Public Schools	student audits and weatherization education
Heartland Ctr. for Leadership Dev.	small business energy planning
Community Action of Nebraska	mobile home weatherization training
Central Nebraska Community Services	contractor training
Mid-Nebraska Community Services	jobs through energy efficiency
Community Action of Nebraska	energy education and audits
Panhandle Community Services	energy audits

Financing Demonstrations

South Sioux City Area Chamber of Commerce	energy loan program
Village of Stuart	energy loan program
City of Schuyler	energy loan program
Park East, Inc ¹	interest buy down program
Neighborhood Housing Services	energy loan program
City of Lincoln	energy loan program

Agricultural

University of Nebraska Institute of Agriculture and Natural Resources, West Central Research and Extension Center	greenhouse cover efficiency
University of Nebraska Institute of Agriculture and Natural Resources, Department of Agronomy	strip and relay crops
University of Nebraska Institute of Agriculture and Natural Resources, Department of Agronomy	crop rotations
47 Ranch Company	solar livestock watering
University of Nebraska-Lincoln Institute of Agriculture and Natural Resources, Departments of Agricultural Engineering and Horticulture	greenhouse management

Feasibility Studies

City of Bellevue, Dock Board	waste to energy study
Indian Center	window efficiency treatments
City of Kimball	electric end-use study
West Central Nebraska Development District	regional energy study

Building Improvement Demonstrations

Northern Natural Gas Company	cogeneration
Jerry Berggren Architects and Associates	courthouse energy improvements
Northeast Nebraska Area Agency on Aging	high efficiency equipment
St. Mary's Catholic Church	insulated glass demonstration
St. Anselm's Church	weatherization demonstration
City of Omaha Housing Authority ²	air conditioning demonstration

Transportation

City of Omaha Public Works Department	traffic signal timing
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1 The Park East Board of Directors, after negotiating a contract, declined the Exxon grant.

2 The Omaha Housing Authority Project was denied by the U.S. Department of Energy as an ineligible use of oil overcharge funds.

Figure 23

Projects Underway

As of June 1988, the following Exxon projects had been fully negotiated and are in various stages of completion:

Energy Education

Hoeger Communications has produced two of the three educational videos. The third video is essentially completed but requires extensive editing because of its special effects.

Stick Together, Never Waste, and Leave Things As You Found Them, for children in kindergarten through third grade, tells the story of three young mole sisters who leave home for the first time and learn about the conservation ethic. *Leave It to Stevie*, for fourth through seventh graders, parodies an early 60s TV situation comedy. Stevie learns about home weatherization techniques as part of a school science project. *Tommy the Waster*, for eighth through twelfth graders, is a science fiction-type story which follows Tommy on a fantastic journey in which he must face all the energy resources he has wasted.

Hoeger received \$80,850 in Exxon funds and contributed \$6,220 in an in-kind match to finance the project.

Management Information Resources produced a pilot energy conservation unit for eighth grade science classes in four participating Lincoln junior high schools. The project involved five teachers and 509 students.

The unit provided instructional materials and several displays, as well as hands-on projects that taught students how electric and gas meters work and how to install weatherization materials such as weatherstripping, caulking, faucet aerators and plastic window film. Students conducted energy audits in their homes and participated in a competition for the best energy-saving ideas. Winners received plaques and U.S. savings bonds.

Exxon funds provided \$35,448 toward the project's costs, and Management Information Resources contributed \$150 in cash and an in-kind match of \$15,534.

Nebraska Council on Economic Education is completing the first of its three-year contract to undertake projects promoting energy education in schools across Nebraska. NCEE made five presentations to teachers and students, distributed 3,320 informational brochures and responded to 477 requests for energy education materials. The Council, in cooperation with the National Energy Foundation, continued to work on its Energy Education Activities book and updated previously published junior and senior high school curriculum guides for national distribution by the Foundation.

Exxon funds for the project amounted to \$98,633 and NCEE provided an in-kind match of \$127,931.

Central Community College contracted to teach high school automotive students to use special diagnostic equipment to improve energy efficiency in automobiles. Work this year involved soliciting bids on the necessary equipment.

Central Community College received \$40,332 in *Exxon* money and provided an \$8,704 in-kind match.

Auburn Public Schools contracted to develop a residential energy audit and weatherization unit for the Auburn High School industrial arts classes. The industrial arts instructor received special training and started to develop the curriculum. The unit will include a minimum of two classes a year and a special six-week summer course, during which students will perform weatherization improvements on local homes. Throughout the year, students will conduct energy audits on local residences.

The project is funded by a \$93,725 *Exxon* grant and a \$1,800 cash match and \$96,010 in-kind match from Auburn Public Schools.

Heartland Center for Leadership Development presented eight workshops to small business owners in Scottsbluff, Ogallala, South Sioux City, O'Neill, Beatrice, Chadron, McCook and Grand Island. Approximately 60 people attended the workshops which explained why efficient energy management should be a practical component of a small business management plan.

Two other workshops are planned to teach business development professionals how to discuss energy management with small business owners. The Center also is conducting a feasibility study of a computerized listing of information a business person may need either to manage energy or to start a business that relates to energy management (such as a building energy audit firm or a weatherization contractor).

The contract is financed by \$68,377 in *Exxon* funds and a \$19,380 in-kind match from the Heartland Center.

Community Action of Nebraska (CAN) contracted to train building contractors in weatherizing techniques for mobile homes, which often require techniques different from those used on site-built homes. CAN negotiated subcontracts with the community technical colleges to develop the curriculum and deliver the training. At least two four-day training sessions will take place at each community college in Omaha, Milford, Hastings, Norfolk, North Platte, Sidney and Scottsbluff.

Exxon funds for the project amount to \$130,810 and CAN has provided \$36,650 cash and \$26,400 in-kind match.

Central Nebraska Community Services sponsored five, two-week training sessions on residential weatherization techniques in the Loup City area. Twenty-one people attended the training sessions, which consisted of six days of classroom instruction and eight days of on-site practicum. Fifteen people were certified as a result of the training program. Central identified nearly 70 energy-related job opportunities for these trainees, who accepted over 50 of them.

Exxon funds covered \$27,621 of the project's costs. The contractor provided an additional \$11,050 in-kind match.

Mid-Nebraska Community Services developed a residential weatherization contractor training program for displaced agricultural workers in the Buffalo County area. The training involves both classroom instruction and hands-on experience weatherizing local residences. Six individuals have started the training program.

The *Exxon* grant for this project amounted to \$126,010; Mid-Nebraska has contributed a \$17,288 in-kind match.

Local Conservation Financing Demonstrations

South Sioux City Area Chamber of Commerce will lend up to \$10,000 per loan at 4 percent interest to weatherize commercial buildings in South Sioux City. Loan funds are leveraged from local banks, and participating banks have committed up to \$66,000 capital over three years.

To date, one potential borrower has scheduled an energy audit and no loans have been made.

Exxon funds have provided \$138,664 to finance the project, together with a cash match of \$66,000 and a \$2,200 in-kind match.

Village of Stuart will lend zero-interest funds for local commercial building weatherization and waste-heat recovery projects. To date, six audits have been completed but no loans have been made.

Exxon funds for the project totaled \$161,500. The Stuart Electrical System provided \$36,000 in matching funds as loan principal, and the Village has made a \$9,258 in-kind match.

City of Schuyler, through the Schuyler Energy Commission, will lend money at 3.6 percent interest to weatherize local commercial, nonprofit and government buildings. Three local banks each committed \$66,500 for loan principal.

To date, six energy audits have been completed and one loan has been approved. The estimated energy savings for the business that received the loan is 282 MBtus, or \$1,580, annually.

The project is financed by \$200,000 in *Exxon* funds, \$199,500 in matching cash and a \$19,916 in-kind match.

City of Lincoln signed a contract at the end of the fiscal year to operate an interest buy-down program to reduce interest rates on loans for weatherizing commercial or mixed-use buildings. The interest rate will be negotiated later. Local utilities will conduct the energy audits.

Exxon funds will amount to \$350,000, the city of Lincoln will provide a \$450,000 cash match and a \$90,724 in-kind match.

Agricultural Projects

University of Nebraska — West Central Research and Extension Station replaced its greenhouse's corrugated fiberglass roofing with double-skinned plastic, which is less opaque and has a higher R-value. The new roof has increased the amount of available light and has reduced furnace use. A comparison of spring 1988 fuel bills to the average spring fuel bill from 1984-87 showed a 39.2 percent reduction in fuel use in March and a 61.8 percent reduction in April. The better growing conditions have allowed the crop research specialist to grow an additional test seed crop. As a result, the time between lab testing and farmer use of such crops may decrease by three to five years.

Exxon funds provided \$13,000 for the project. The contractor provided \$9,100 and an in-kind match of \$17,436.

University of Nebraska's Department of Agronomy conducted a strip and relay cropping project that demonstrates the energy savings potential of alternating crop types in a field from year to year and growing more than one type of crop in a field at the same time. Alternating grasses and legumes with crops like corn increases the amount of nitrogen in the soil, thus reducing the need to apply additional nitrogen.

Fourteen farmers throughout eastern Nebraska developed plans and planted demonstration fields.

Exxon funds provided \$40,000; UNL made an in-kind match of \$66,440.

University of Nebraska's Department of Agronomy also sponsored a crop rotation project to demonstrate ways of increasing nitrogen in the soil, to reduce the need to apply man-made nitrogen.

Nineteen farmers from east and south central Nebraska are cooperating in the project. Agronomists took deep soil samples from their fields to test for existing nitrogen content. Test results were used to determine appropriate nitrogen application rates.

Exxon funds for the project amounted to \$40,000; UNL provided \$500 cash and \$68,940 in an in-kind match.

47 Ranch Company contracted to install fencing and photovoltaic-powered water pumps to manage cattle grazing patterns and optimize range use. Wells, pumps and water tanks have been installed and monitoring of the energy output of the photovoltaic cells has begun.

Funding for the project comes from a \$47,575 *Exxon* grant and 47 Ranch Company's \$5,474 in-kind match.

University of Nebraska's Departments of Agricultural Engineering and Horticulture used *Exxon* funds to develop a greenhouse management system. The system includes computerized energy/temperature controls, a new greenhouse structural design and an information database that Nebraska greenhouses can use to optimize energy use and increase plant production. Greenhouses in four locations were monitored to determine existing environmental conditions, growth responses and energy usage.

Exxon funds covered \$186,637 of the project's costs; UNL provided a \$212,759 in-kind match.

Technical Assistance/Efficiency Studies

City of Bellevue Dock Board studied the feasibility of building a waste-to-energy facility in Bellevue, to serve the Douglas-Sarpy County area. The engineering firm hired to conduct the study has prepared a preliminary report which 1) assesses the type and amount of waste produced in the area; 2) discusses the possibility of converting the Kramer electric generating plant (owned by NPPD) to burn the waste and 3) explores types of plants which could be built. The firm has asked for more time to determine potential customers for the steam or electricity which the plant would generate.

Exxon funds have provided \$100,000 for the project, OPPD has made a \$100,000 cash match, and the contractor has provided a \$9,983 in-kind match.

Indian Center, Inc. has completed a study of the feasibility of creating a Native American business to produce insulated window treatments that incorporate Native American art. The study concluded that enough insulated window treatments are already available and that products incorporating Native American art would have a limited market.

The steering committee then suggested researching the feasibility of marketing the window treatments as part of an entire interior design package focusing on energy efficiency and Native American themes. The cost of producing a prototype window treatment, however, proved to be prohibitive and the study was closed.

The contract totaled \$5,720 of *Exxon* funds. The Indian Center provided a \$9,250 in-kind match.

City of Kimball contracted to conduct an end-use metering survey of electricity users in Kimball. The results of the study will be used to improve the efficiency of the electric system, either through load management or conservation measures. Bids have been taken on the equipment needed to conduct the survey.

\$20,000 of the project costs are covered by *Exxon* funds; another \$20,000 is provided by an in-kind match.

West Central Nebraska Development District conducted an energy consumption study of the 18 counties around Ogallala, to determine the economic effects of energy use in the communities. Results of the study were presented to 16 city councils of the 32 communities belonging to the District. Study results also were distributed, along with other pieces of energy information, at the Ogallala Home, Agri and Sports Show, attended by approximately 3,000 people.

Exxon funds covered \$30,000 in project costs; the District provided an \$8,398 cash match.

Public and Nonprofit Building Improvement Demonstrations

Northern Natural Gas Company has undertaken a project to determine the potential energy savings of using natural gas to cogenerate electricity and hot water or steam in buildings in eastern Nebraska. One hundred fifty institutions of higher education, high schools, nursing homes and hospitals were contacted and seven returned applications expressing an interest in using cogeneration. Northern will work with those organizations to complete engineering studies in their buildings and determine the potential for cogeneration.

The project is financed by \$200,000 in *Exxon* funds, \$300,600 cash and a \$34,400 in-kind match from NNG.

Berggren and Woll Architects have initiated the Courthouse Trail program to demonstrate the savings potential of energy efficiency improvements in historically significant courthouses. All courthouses in Nebraska were asked to participate. Twenty-five applications were received from across the state. The selection committee chose courthouses in Antelope, Gosper, Hamilton, Kimball and Pawnee counties to participate in the program. (Alternates are Sherman and Johnson counties.) Berggren and Woll visited each site to determine which type of energy improvements could be made at each building. Negotiations about the improvements are continuing.

Exxon funds covered \$629,454 in project costs. The counties provided \$166,669 in cash and the contractor made an in-kind match of \$6,120.

Northeast Nebraska Area Agency on Aging contracted to demonstrate the energy savings potential of high-efficiency furnaces and air conditioners. Work has begun to replace inefficient equipment in the Senior Centers in Randolph, Pierce, Stanton and Decatur.

Costs of the project are covered by \$16,307 in *Exxon* funds and the Agency's cash match of \$3,850 and in-kind match of \$1,000.

St. Anselm's Church in Anselmo completed an insulation project in which volunteers installed blown-in cellulose insulation in the attic of the church's vaulted ceiling. In addition, the crawl space was insulated; and ceiling vents were closed off to reduce energy use in the church. Nebraska Public Power District and the local power district partially funded the installation of water-source heat pumps.

St. Anselm's plans to hold an open house to allow building managers from other churches to learn about and view the efficiency improvements.

Exxon funds provided \$3,500 for the project and St. Anselm's provided a \$1,875 in-kind match.

Omaha Public Works Department has nearly finished installing traffic signal synchronization equipment and has continued to computerize signal timing patterns. Completion of the project was delayed due to weather and difficulties with the subcontractor.

One hundred twenty-five intersections will be affected by the work, which will reduce traffic stops, delays and idling time, thereby making automobiles more efficient.

Exxon funds account for \$500,000 of total project costs; the contractor has made a \$228,861 in-kind match.

Projects Not Underway

These contracts have not yet been negotiated with project sponsors.

Community Action of Nebraska (CAN) also had proposed an energy education and audit project, but negotiations were delayed while CAN completed arrangements for its mobile home weatherization training contract. This project was linked to NEFI which was later ruled ineligible. Negotiations have not proceeded.

Panhandle Community Services had proposed an energy audit project partially in support of the Nebraska Energy Fund, Inc. Since NEFI was ruled ineligible for *Exxon* funds, negotiations for the PCS project have not yet begun.

Neighborhood Housing Services had proposed an energy loan program in 1986. Negotiations are still going on. The Energy Office hopes to reach an agreement by December of 1988.

St. Mary's Catholic Church proposed a project to demonstrate the energy efficiency savings of insulated glass. The Energy Office engineer inspected the church to determine the most feasible type of window efficiency project. A draft of the "Scope of Work" section of the contract has been completed.

The Legislature declined to appropriate funds for the **Valmont Industries** and **Hastings Pork** contracts.

Stripper Well Funds

During 1987-88, a total of \$619,584 from *Stripper Well* Petroleum Violation Escrow Funds has been allocated to the Weatherization Assistance Program. (For more information about *Stripper Well* funds, see page 39.)

Amoco Funds

In January 1988, the Energy Office contracted with Agritech, Inc., to conduct a two-year project demonstrating the use of sugar beet transplants in 168 acres of minimum or

no-tilled soil. Eight farmers from Morrill and Scotts Bluff Counties participated in the project, intended to demonstrate the energy savings potential of using transplants in conjunction with minimum or no-till methods. In addition, the production methods used in the project will help farmers meet the soil conservation requirements of the 1987 Farm Bill.

\$55,000 of *Amoco* oil overcharge funds were used to cover the project costs.

WEATHERIZATION DIVISION

The Weatherization Division administers the Low-Income Weatherization Assistance Program — a federally-mandated program to weatherize homes to save money and energy. The Energy Office is responsible for inspecting about 40 percent of the homes receiving weatherization and for monitoring and auditing the subgrantees — primarily community action agencies which actually make the home weatherization improvements.

WEATHERIZATION ASSISTANCE PROGRAM

In 1987-88, funding for the program was \$3,795,509. The Department of Energy's Low-Income Weatherization Assistance Program provided \$2,045,853, the Low-Income Energy Assistance Program (administered through the Nebraska Department of Social Services) supplied \$1,598,515 and \$151,141 came from *Stripper Well* petroleum violation escrow funds.

A total of 2208 homes were weatherized in 1987-88. In keeping with the Agency's priority to serve Nebraska's elderly community through the Low-Income Weatherization Assistance Program, the Weatherization Division weatherized 885 elderly households, or 40.1 percent of all the homes weatherized during that period.

Home improvements made through the program saved Nebraskans a total of \$375,756 in avoided energy costs during 1987-88. That translates to an average of \$170.18 per household.

Figure 24 shows the historical and current first-year rate of return on investments made under the Low-Income Weatherization Assistance Program. Home energy improvements result in an average year-to-year return of 10 cents on the dollar. Fluctuations in the first year return are generally due to changing labor and materials costs.

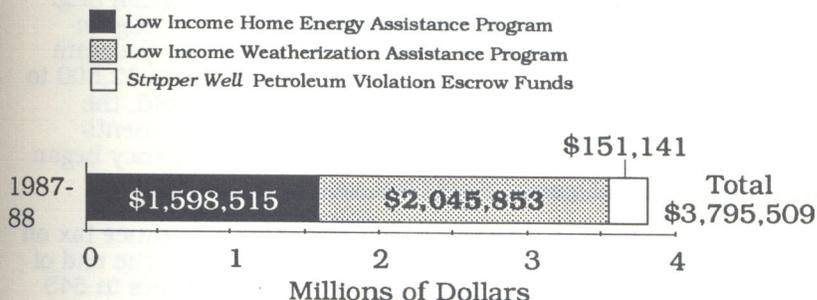
The home improvements represent a one-time investment that will most likely yield a rate of return for at least fifteen years. Thus, the rate of return on an investment made in 1987 or 1988 would return over 150 percent for the functional lifespan of the improvement. If either energy prices or the value of money increases, the rate of return also will increase.

TECHNICAL ASSISTANCE GRANT

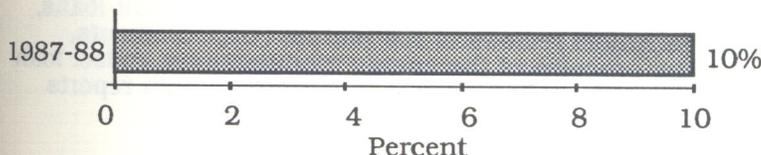
During 1987-88, the Energy Office received a \$10,000 technical assistance grant from the U.S. Department of Energy to assist in planning the future

direction of the regional approach to furnace retrofits, diagnostic equipment and automated energy audits. In May 1988, DOE officials from Washington D.C. and Kansas City, MO, along with weatherization program staff from Nebraska, Iowa, Kansas and Missouri met for a two-day seminar in Lincoln to further the goals of the grant. The Energy Office continues to coordinate project activities with DOE.

Weatherization Assistance Program Investments



Weatherization Program Return on the Federal Investment



Source: Nebraska Energy Office

ENERGY FINANCING DIVISION

The Energy Financing Division administers these state and federal programs which fund the weatherization of homes, schools and hospitals: the Nebraska School Weatherization Program, the Energy Bank and the Institutional Conservation Program. The Division also administers funds for a home improvement loan program in the Benson neighborhood in Omaha, a commercial loan program in Verdigre, provides technical and financial assistance and oversees the Municipal Natural Gas Regulation Revolving Loan Fund (See page 45 for more information on the Municipal Natural Gas Regulation Revolving Loan Fund.)

All these programs are designed to reduce the use of energy in buildings – and they reflect sound public policy. During the time these programs have been in existence, Nebraskans have saved millions of dollars through more efficient use of energy resources.

A recent example from the Nebraska School Weatherization Program illustrates the potential for energy and dollar savings. Otoe Elementary School in Otoe achieved a 45.7 percent reduction in energy use, saving taxpayers \$1,137 during the first year. After paying for the \$6,267 in building improvements, the school district should realize a net savings of \$11,000 during the 15 year functional lifespan of the improvements.

NEBRASKA SCHOOL WEATHERIZATION PROGRAM

In 1981, the Nebraska Legislature created the School Weatherization Program – the first on-going state-supported effort to weatherize K-12 public schools. The program originally awarded grants for energy conservation building improvements to participating schools. In 1985, the program began making Technical Assistance grants of up to \$2,500 to pay for energy studies on school buildings. In 1986, the format for funding energy saving building improvements changed from grants to no-interest loans. The agency began making loans in December of that year.

The program is funded through the state severance tax on natural gas and oil. Since its beginning and until the end of 1987, the program has grants and loans for projects in 645 school buildings, representing a total investment of \$20,466,709. The investment has generated an average return of \$4,754,871 per year in energy cost savings.

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

No-Interest Loans

During the 1987-1988 fiscal year, 39 school districts applied for 64 energy improvement loans totaling \$2,223,378. In addition, another \$302,367 has been set-aside for 13 loans

in eight school districts as a result of accepted project inquiries. School districts applying for loans can borrow as much money toward their energy-related improvements as they can repay in 14 years, using half of the energy savings generated by the improvements.

The loan portion of the Program is designed so that a school district retains half of the savings resulting from the energy improvement, while the rest goes toward repayment of the loan. This structure allows schools to immediately share in the savings their projects achieve.

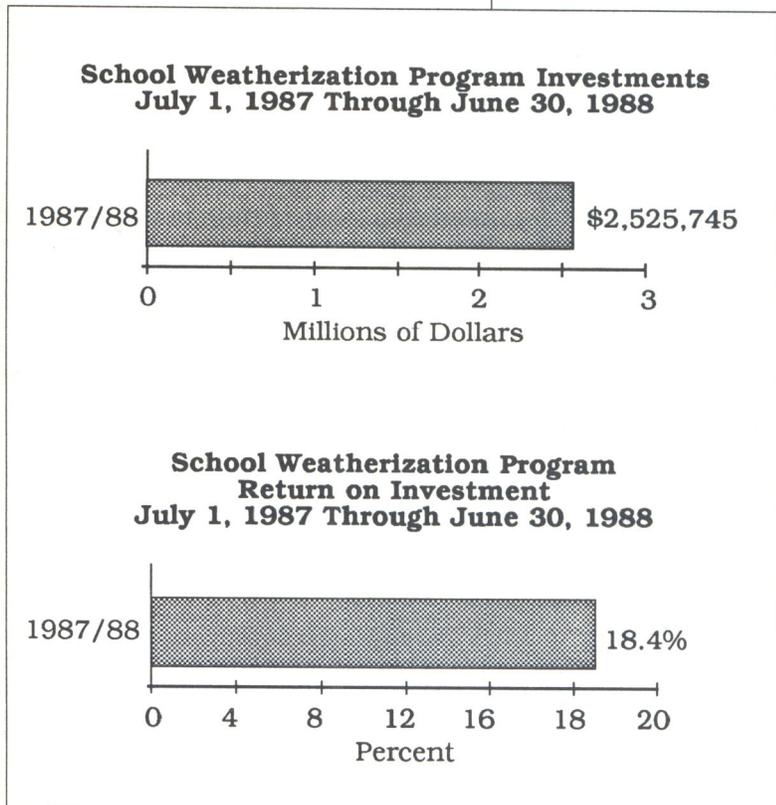
As of June 30, 1988, the Program's loan pool contained \$8.08 million of which \$4.4 million was still available for loans. In addition, there was \$208,514 available for Technical Assistance Grants.

As Figure 25 illustrates, the schools receiving loan funds in 1987-88 are projected to earn an 18.4 percent rate of return on investment. If the life of the improvements continues for 15 years, the return on investment would be 246.7 percent, providing energy prices and the value of money remain at current levels. An increase in either would increase the return on investment accordingly.

Technical Assistance Grants

The Program provides up to \$2,500 per building to finance a technical study and report on the building and its energy-using systems. A registered professional engineer or engineer/architect team must conduct the study, which identifies all potentially cost-effective conservation measures, as well as energy-efficient changes in operation and maintenance procedures.

During 1987-88, the Energy Financing Division issued grants totaling \$75,000 to 26 school districts to do technical assistance studies in 30 buildings.



Source: Nebraska Energy Office

Figure 25

ENERGY BANK

The U.S. Department of Housing and Urban Development (HUD) funds the Solar Energy and Energy Conservation Bank Program, which provides grants or loan subsidies to low- and moderate-income home owners to make energy-saving home improvements. The average value of the improvements is \$1700 to \$1800, of which approximately \$700 is subsidized by the Energy Bank. Homeowners, the municipality or private lending institutions provide the balance of the funds to make the improvements.

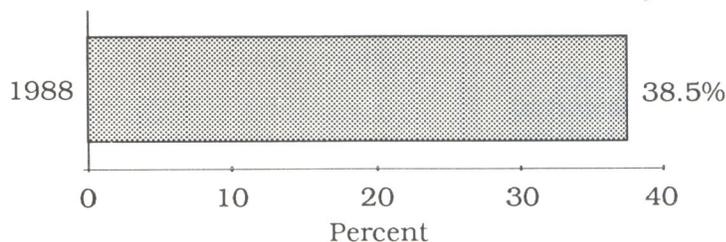
The Energy Office contracts with municipal governments to run the Energy Bank Program locally. The Energy Financing Division monitors the local governments' performance and inspects a portion of the homes in which improvements were made.

When the Energy Bank Program began in 1983, it provided assistance only to Lincoln and Omaha. In 1984, the program was expanded to allocate funds to the communities of Allen, Fremont, Schuyler, South Sioux City, Lexington, Burwell and Wood River. Figure 22 shows the participating communities and the amounts allocated from the Energy Bank in 1987-88.

**Energy Bank Investments
July 1, 1987 Through June 30, 1988**

Community	Energy Bank Grants 1987-88
Allen	\$0
Fremont	\$33,175
Lincoln	\$28,599
Omaha	\$0
Schuyler	\$25,600
South Sioux City	\$0
Wood River	\$0
Total	\$87,374

**Energy Bank Return on Investment
For the First Year**



Source: Nebraska Energy Office

Budget Cuts and Recaptured Funds

Federal budget cuts have severely reduced the Energy Bank funds available from HUD for distribution to Nebraska communities. However, because Nebraska has been able to use all the funds awarded, the state has benefited from recapture of funds from other states. During 1987-88, the Energy Office received \$50,200 of recaptured funds for the Energy Bank. The Energy Office granted \$87,374 to the communities listed in Figure 26.

Energy-saving home improvements made through the Energy Bank Program during this period were projected to save Nebraskans a total of \$33,651, or an average of \$227 per household in avoided energy costs. That is equivalent to 523,000 kilowatt hours of electricity, enough electricity for 60 homes for an entire year.

Return on Investment: 577.5%

These home improvements represent a one-time investment that will most likely yield a return for at least 15 years. A one-time investment made in 1987 will yield a one-year rate of return

of 38.5 percent. Over the functional lifespan of the improvement, the return will be 577.5 percent. If the price of energy or the value of money increase, the return would increase accordingly.

INSTITUTIONAL CONSERVATION PROGRAM

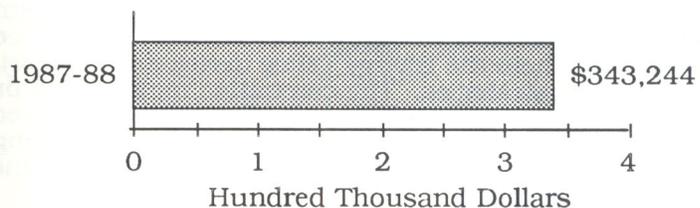
The Institutional Conservation Program (ICP) provides federal funds in 50/50 matching grants to hospitals and public and private schools, either for engineering studies to identify cost-effective, energy-saving building improvements or for actual implementation of energy improvement projects. A certain percentage of funds each cycle is set aside for hardship grantees where the amount of the grant can be up to 90 percent. The Energy Office provides program information to applicants, reviews and ranks applications, submits project proposals to the U.S. Department of Energy for final review and monitors the progress of approved projects.

1987 and 1988 Grants

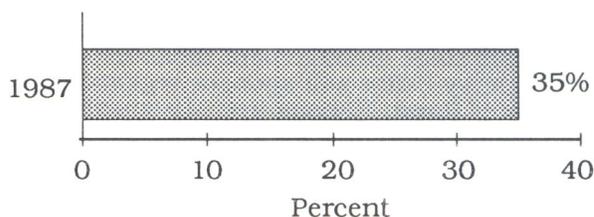
In August 1987, the U.S. Department of Energy distributed a total of \$343,244 awarded during the first half of 1987-88 under ICP's Cycle IX — \$43,713 for engineering studies on 25 buildings and \$299,531 for energy conservation projects on 29 buildings. The projects funded by 1987 grants are estimated to cost \$527,170, but are expected to save \$120,427 annually in avoided energy costs.

Under ICP's Cycle X, seven schools and hospitals applied for \$39,643 for engineering studies in 15 buildings and 15 schools and hospitals applied for \$431,220 to fund energy-saving building improvement projects in 24 buildings. Only \$343,758 is available for grants in ICP's Cycle X. Grants are expected to be awarded in the fall of 1988.

**Institutional Conservation Program Investments
July 1, 1987 Through June 30, 1988**



**Institutional Conservation Program
Return on Investment for the First Year**



Return on Investment: 525%

As Figure 27 shows, the first year return on the investment for 1987 is 35 percent. The building improvements are a one-time investment which will most likely yield a return for at least fifteen years. Thus, the return on that one-time investment made in 1987 will yield more than a 525 percent return over the lifespan of the improvements. If either the price of energy or the value of the dollar increases, the rate of return will likewise increase.

ENERGY SHORTAGE MANAGEMENT PLANNING

Nebraska's contingency planning activities are designed to be consistent with and complement federal emergency planning strategies. When the Reagan Administration eliminated petroleum price and allocation controls in 1981, the U.S. Department of Energy developed emergency preparedness planning and response programs that recognized free market principles and the rights and responsibilities of industry and the states. The multi-faceted approach that the DOE adopted through its Office of Energy Emergencies includes:

- Reliance on the free market
- Maintenance of strategic crude oil stockpiles, with a plan to draw down the Strategic Petroleum Reserve early and in large volumes in response to a major oil supply disruption
- Cooperation with the International Energy Agency to promote energy security and cooperation among member nations
- Coordination of federal activities with those of the states, providing for effective two-way communication with the states and promoting cooperative interaction among the states.

Involving the Public

During 1987-88, Nebraska continued to strengthen its ability to deal with a potential energy crisis. The new element in the state's contingency plan is public involvement. In the event of an energy crisis, the response of Nebraska's citizens will determine the success of energy shortage management measures. Therefore, a 22-member advisory committee was appointed to help the Energy Office devise energy shortage management strategies. The committee represents a broad spectrum of energy suppliers and consumers whose recommendations the Energy Office will consider in preparing an energy shortage management plan, a set-aside plan and a local planning guide.

Regional Cooperation

As activities continue in the area of contingency planning, the Energy Office will establish an implementation process, issue the plan and participate in emergency simulation exercises to test the validity of the implementation process and energy shortage management measures. In addition, the Nebraska Energy Office will sponsor regional meetings with adjacent states (Iowa, Kansas and Missouri) to stimulate interstate cooperation and information exchange for dealing with energy shortages and emergencies.

NATURAL GAS TECHNICAL ASSISTANCE

Approximately one-third of Nebraska's natural gas consumers receive their service from publicly-owned natural gas utility companies. Six investor-owned natural gas companies provide service to the other two-thirds of the state. Natural gas is imported into Nebraska primarily through major pipelines operated by Northern Natural Gas Company and KN Energy.

Nebraska is one of only two states in the nation to regulate natural gas suppliers at the local level. Village boards and city councils review rate requests under the *Municipal Natural Gas Regulation Act of 1987*. The Energy Office also provides technical assistance to communities in this area.

Primary Natural Gas Flow in the United States



Source: Natural Gas Purchasing Opportunities for Nebraska Communities under FERC's Open-Access Rule

MUNICIPAL NATURAL GAS REGULATION ACT

As natural gas prices began to rise, local officials found themselves faced more often with a growing number of regulatory issues — making what had once been relatively routine regulation more difficult. In an effort to ease those difficulties and standardize the procedures communities used to regulate natural gas rates, the Legislature passed the *Municipal Natural Gas Regulation Act* in 1987.

The Act established procedures for reviewing general rate increases and for filing and reviewing municipally-initiated rate increases and supply-cost-adjustments.

Municipal Natural Gas Regulation Revolving Loan Fund

The Municipal Natural Gas Regulation Revolving Loan Fund was created in 1987 by the *Municipal Natural Gas Regulation Act*. The Loan Fund is capitalized with severance tax receipts and serves local governments by providing financial support for rate filing studies and for judicial review, if necessary. Communities receive no-interest loans which area ratepayers repay through the local gas company.

Regulations were adopted governing administration of the Municipal Natural Gas Regulation Revolving Loan Fund and took effect on September 1, 1987. To date, five rate areas representing 29 communities have received loans totaling \$97,773 for rate hearings. Four rate areas representing 23 towns have applied for \$66,600 to finance the cost of district court review.

PUBLIC OFFICIALS' HANDBOOK ON NATURAL GAS REGULATION

In October 1987, the Energy Office distributed 600 copies of the *Public Officials' Handbook on Natural Gas Regulation* to

municipal clerks and city attorneys. The Handbook provides guidelines for using the regulatory process established by the *Municipal Natural Gas Regulation Act*, to better serve customers, communities and natural gas suppliers.

REPORT ON FERC'S OPEN-ACCESS RULE

In July 1988, the Energy Office distributed an addendum to the Handbook in the form of a report titled, "Natural Gas Purchasing Opportunities for Nebraska Communities under FERC's Open-Access Rule." Although the Federal Energy Regulatory Commission issued Order 436 in 1985, repeated legal challenges caused a great deal of uncertainty over its status. In April 1988, however, the U.S. Supreme Court refused to review the Commission's Order, thus putting legal challenges to rest and leaving the Order intact.

The Energy Office's report explains the new regulations governing "open access" transportation of natural gas through pipelines. FERC's Open-Access Rule allows a pipeline to function much like any other common carrier, such as a railroad or truckline. It ships gas for whoever will pay the transport costs. Thus, the pipeline owner simply charges a utility or business a fixed fee for transporting gas purchased from a natural gas producer.

The intent of the report is to review the history of natural gas regulation and to discuss those factors which Nebraska's villages and towns should evaluate when considering buying gas under FERC's Open-Access Rule. Figure 28 is an illustration from the report.

OPERATIONS

This description of Energy Office Operations reviews the agency's finances and its organization.

FINANCIAL REVIEW

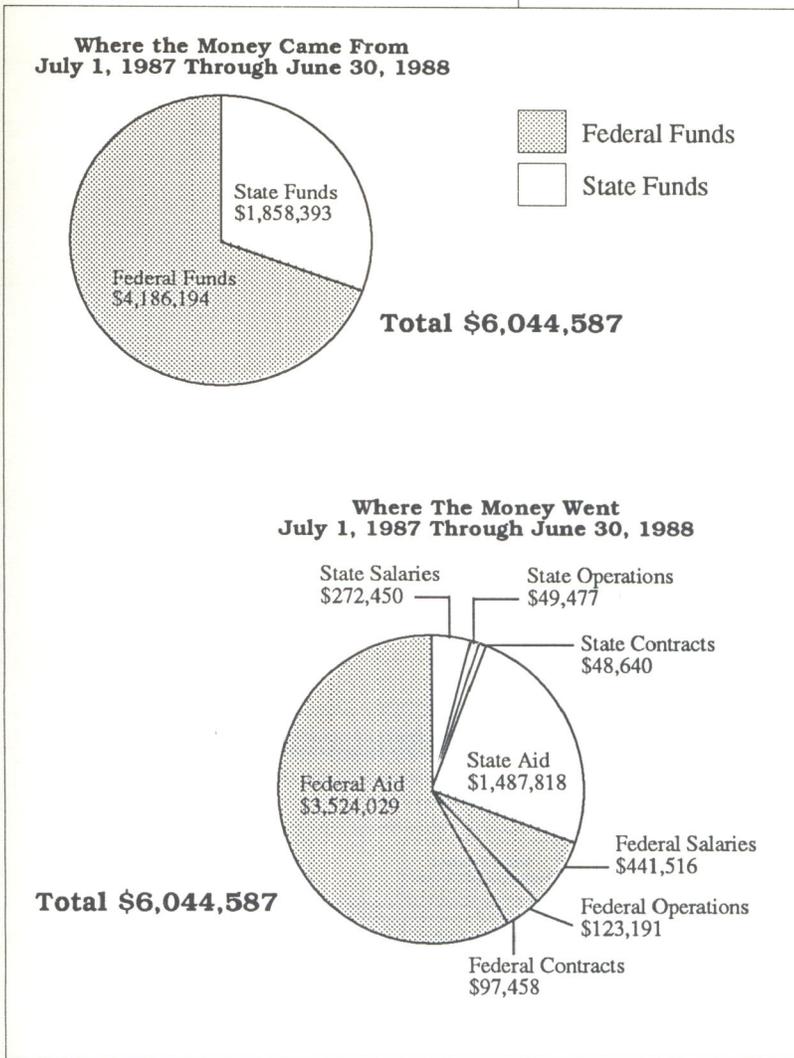
Where the Money Came From

Figure 29 illustrates the Energy Office's operating budget from July 1, 1987, through June 30, 1988, which amounted to \$6,044,587. Approximately 70 percent of the Agency's funding, or \$4,186,194, came from federal sources. Almost 85 percent of federal funds were used for either Low-Income Weatherization Assistance or the Energy Bank. Generally, federal funding has stabilized after several years of declines.

The Energy Office received \$1,858,393 for Agency operations and grants. State funds came exclusively from severance taxes. No General Funds have been appropriated to the Energy Office since 1983. Funding declines from state sources is attributable to declining severance tax revenues.

Where the Money Went

As Figure 29 shows, the Energy Office spent state and federal dollars in eight different ways. Aid, which makes up the largest portion of the Agency's expenditures, consists of federal or state money which the Agency receives and passes on either to delegate agencies or directly to beneficiaries such as schools. Money spent for Operations pays travel, telephone, computers and other administrative expenses. Contracts, funded with state or federal dollars, are primarily for research or demonstration projects. Since petroleum violation escrow funds are trust monies, they are excluded from the budget figures on this page. A full accounting of those funds appears on pages 29-30.



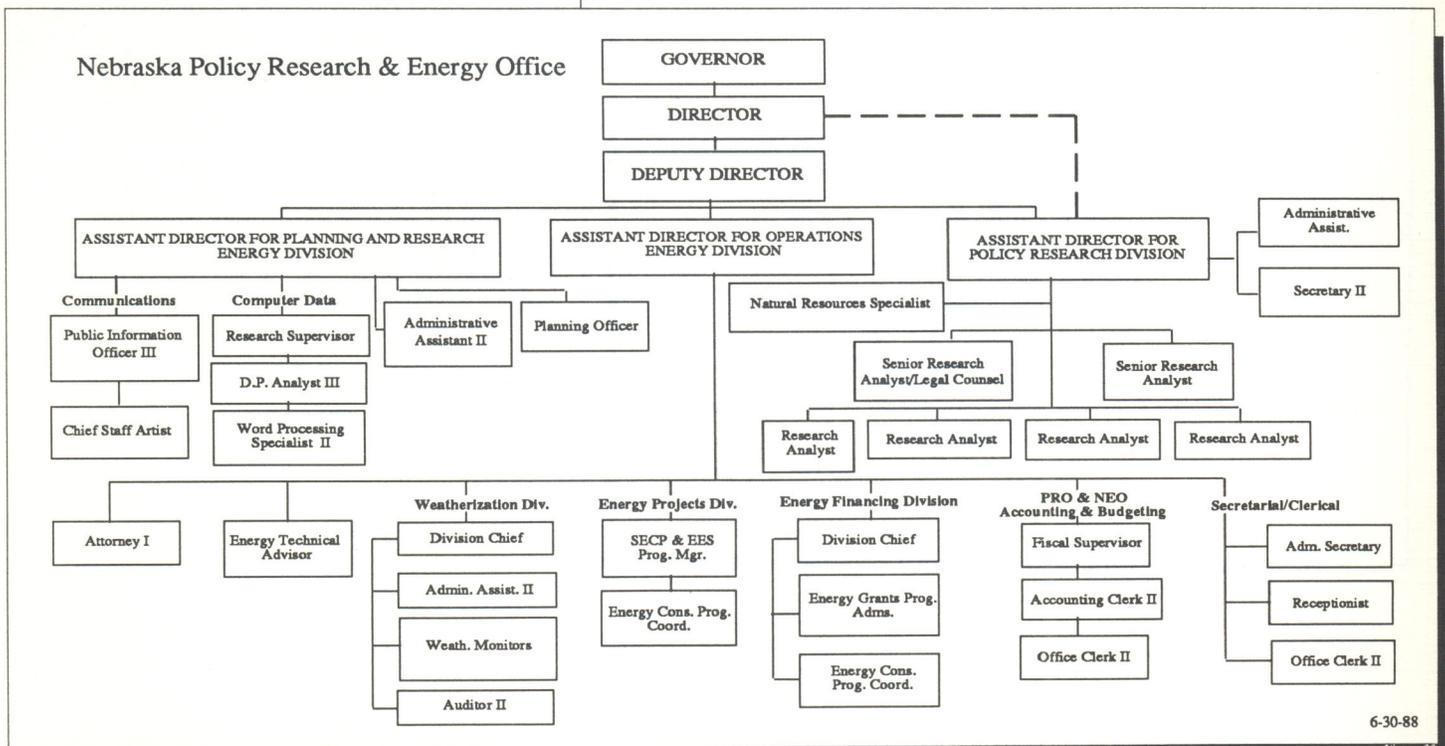
Source: Nebraska Energy Office

Figure 29

ORGANIZATION

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

The Organizational Chart below (Figure 30) shows the functional structure of the Nebraska Policy Research and Energy Office, as of June 30, 1988.



6-30-88

Figure 30

