Nebraska ENERGY QUARTERLY

Nebraska Energy Office

Summer 1991

*Tackling the Issues...*

# Energy Policy Council Gets Down to Work

The Nebraska Energy Policy Council held its organizational meeting in Lincoln on April 17, 1991. The 53-member policy group was charged by Governor Nelson to develop the state's first energy policy plan. Members divided into five working committees — alternative fuels, buildings, electricity, waste to energy, and fossil fuels.

### Officers Selected

Corrinne Pedersen of Lincoln was selected by the Governor to serve as the Council's Chairperson. Pedersen, Nebraska Municipal Power Pool's Community Development Director said that the Energy Policy Council will give,

*Continued on Page 4*

Governor Ben Nelson (left), Energy Office Director Bob Harris, and Policy Council Chairperson Corrine Pedersen go over a few details before the first meeting of the Nebraska Energy Policy Council.

# Inside



*Saving Energy on Farms and Ranches...*

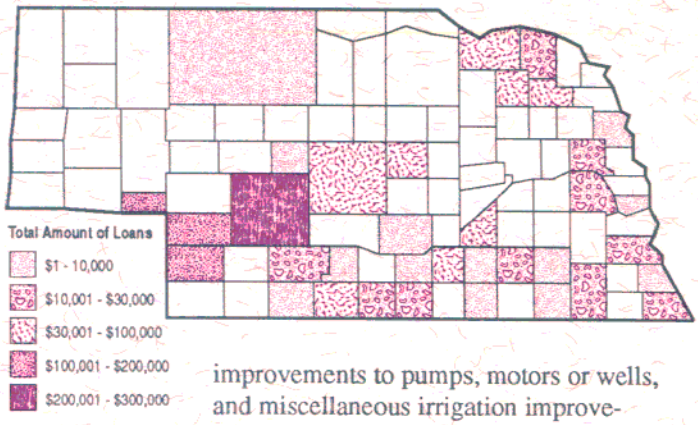
# Over $1.3 Million in Loans Made

In less than one year, over $1.3 million in loans have been made for agricultural projects under the 5% Dollar and Energy Saving Loan Program. The loans were financed with $722,975 in oil overcharge funds and $590,995 from lenders participating in the loan program.

As of early May, 76 loans had been made for 88 different energy saving improvements in 35 counties. Four counties — Lincoln, Perkins, Deuel, and Chase have accounted for over 42% of the agricultural funds loaned to date. Agricultural loans are averaging about $17,289, significantly higher than the average residential loan because the improvements being made have been more extensive and costly.

### Irrigation Projects Predominate

Over 62% of the agricultural loans were used for irrigation projects such as conversion to low pressure pivots, improvements to pumps, motors or wells, and miscellaneous irrigation improvements such as reuse pits and larger pipes. The other major category included building improvements. Examples include insulation, infiltration reduction, modifications in the heating, cooling, ventilating, and water heating systems in shops or confinement facilities. Miscellaneous projects financed were recirculating grain dryers, heat recovery milk coolers, no-till planters, and feed mixer

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*Omaha and Lincoln Events April 21st...*

# Earth Day 1991

The state's focal points for Earth Day were in the two largest cities, Omaha and Lincoln, and the Energy Office was there. In Omaha, thousands participated in nine hours of events — a parade, numerous activities on three different stages and over 100 booths.

On the Electric Stage in Omaha, Governor Ben Nelson said state officials "have not paid as much attention to the environment as we should have in recent years." He said that the state is working to find ways to use energy more wisely. "We can always do more, and do it better," the Governor said. He cited planting trees, conserving water

An Energy Office staff member (right) describes how the free energy saving devices can help lower heating and cooling costs. Information was also provided on planting trees for maximum energy saving benefits.

and electricity, driving less, using environmentally safe products, and developing alternative fuels as activities the state is pursuing.

In the heart of the Omaha exhibit area was the Energy Office booth. Staff members distributed one of Earth Day's more popular free items — seedling trees. All of the 1,000 scotch pines were gone in less than two hours. Other energy saving items being distributed were air infiltration plugs and furnace whistles which remind homeowners when their furnace filters require changing or cleaning. Earth Day-goers were also provided with home energy saving tips and reminders on purchasing ethanol enhanced fuels.

Lincoln's Earth Fair was markedly different from Omaha's festival atmosphere. Centered in Pioneers Park, Nebraska Wesleyan's annual jazz festival was augmented by environmentally-oriented booths from local organizations including the Energy Office.

*Summer School at National Labs...*

# Students Picked for Energy Honors Program

Plunging into the local watering hole or cruising the mall will not be the only activity scheduled this summer for nine of the state's brightest high school seniors. They have been selected for the Energy Honors Program and will spend two weeks studying at one of the seven U.S. Department of Energy research labs and the National Science Youth Camp. The all-expenses-paid program, which began in 1985, provides science students across the country with an opportunity to receive state-of-the-art instruction in areas like supercomputers, high energy physics, biological and genetic science, and chemistry.

*Continued on page 8*

**Energy Honors Program Selectees and Alternates**

| | *Selected* | *Alternates* |
|---|---|---|
| **Argonne National Laboratory** | **Argonne, IL** | |
| | Kristin Warner | Chad Mailander |
| | Papillion-LaVista H.S. | Spalding Academy |
| **Fermi National Accelerator Laboratory** | **Chicago, IL** | |
| | Stacy Dean Uden | Jonathan D. Ebmeier |
| | Millard North H.S. | Laurel-Concord H.S. |
| **Lawrence Berkeley Laboratory** | **Berkeley, CA** | |
| | Beth Kozel | David William Volk |
| | Marian H.S. | Lincoln Southeast H.S. |
| **Lawrence Livermore Laboratory** | **Livermore, CA** | |
| | Pete Thorson | Dominic Joseph Bartek |
| | Omaha Central H.S. | Bishop Neumann H.S. - Wahoo |
| **National Synchrotron Light Source** | **Upton, NY** | |
| | Kiet Chau | Mary C. Schainost |
| | Lincoln H.S. | Lincoln Pius X H.S. |
| **Oak Ridge National Laboratory** | **Oak Ridge, TN** | |
| | Jaci Shoemaker | Christina Merten |
| | North Loup Scotia H.S. | Lincoln Pius X H.S. |
| **Pacific Northwest Laboratory** | **Richland, WA** | |
| | Andrew Pershing | Jerry Ellis Jacobitz |
| | Hastings Senior H.S. | Henderson Community School |
| **National Science Youth Camp** | **Monogahela National Forest, WV** | |
| | Colleen Cleary | Kobporn L. Cha |
| | Omaha Benson H.S. | Omaha Central H.S. |
| | Scott Annin | Ronald Chen |
| | Lincoln East H.S. | Hastings H.S. |

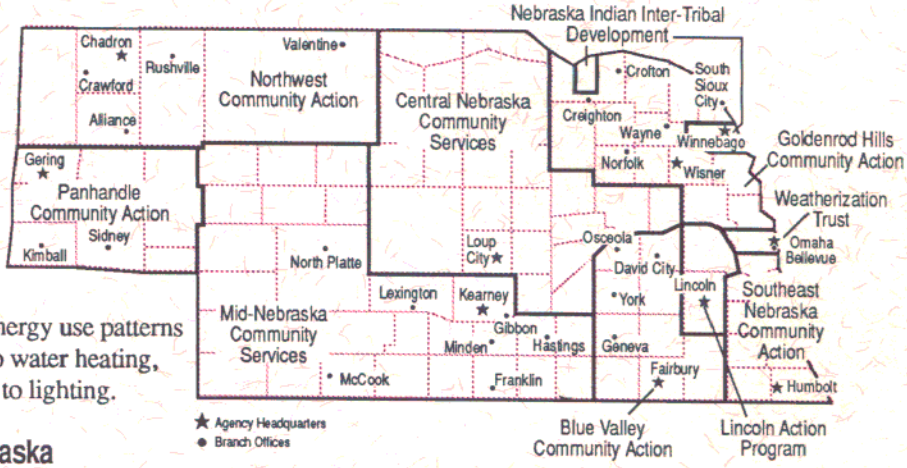
*Free Weatherization Program.....*

# Furnace Inspections Now Being Done

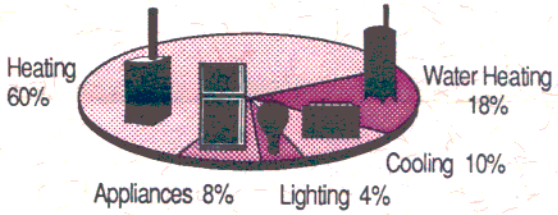
Since the federally-funded Low-Income Weatherization Assistance Program debuted in Nebraska in 1977, the primary emphasis has been on stopping air infiltration and the loss of heat from the home. However, in 1987, heating systems were added as one of the improvements which could be made in a home.

For the first time, the Weatherization Program came face-to-face with every home's energy hog — the furnace. In Nebraska, typical residential energy use patterns are: 60% devoted to space heating, 18% to water heating, 10% to cooling, 8% to appliances, and 4% to lighting.

### Weatherization Service Areas




### Typical Energy Use in Nebraska




### A Cost-Effective Recommendation

The Energy Office contracted with the University of Nebraska-Lincoln in 1985-86 to analyze what type of furnace improvements would be the most cost-effective. Their recommendation was to perform efficiency inspections which included a tune-up and cleaning on forced air natural gas furnaces prior to making any weatherization type improvements to a home. Generally, the expanded inspection maximized the furnace's operating efficiency and safety. Remaining improvements to any single home would then be devoted to weatherizing the building's walls, ceilings, and exterior openings — the envelope.

When a home has been weatherized under the program, less air enters and leaves the dwelling — basically, it's a tighter, more energy efficient building. When a home is made tighter, hazardous emissions coming from a malfunctioning heat source could endanger human life. Primarily for safety reasons, the efficiency inspection program was expanded in 1990 and 1991 to include all forced-air furnaces, gravity furnaces, boilers, floor and wall furnaces, and console heaters.

To find out more about the state's free weatherization program, **contact the community-based organization serving your county**. Under the Low-Income Weatherization Program eligibility guidelines, approximately 18% of the state's households could qualify for free weatherization services.

### Nebraska Low-Income Weatherization Assistance Program Organizations

Blue Valley Community Action, Inc.
P.O. Box 273
Fairbury, NE 68352
(402) 729-2278

Central Nebraska Community Services
P.O. Box 509
Loup City, NE 68853
(308) 745-0780

Goldenrod Hills Community Action Council
P.O. Box 280
Wisner, NE 68791
(402) 529-3513

Lincoln Action Program
2202 South 11th Street
Lincoln, NE 68502
(402) 471-4515

Mid-Nebraska Comm. Services, Inc.
P.O. Box 2288
Kearney, NE 68848
(308) 234-2591

Nebraska Indian Inter-Tribal Development Corp.
Rural Route 1, Box 66-A
Winnebago, NE 68071
(402) 878-2242

Northwest Community Action
300 West 2nd Street
Chadron, NE 69337
(308) 432-3393

Panhandle Community Services
3350 10th Street
Gering, NE 69341-1700
(308) 635-3089

Southeast Nebraska Community Action Council
P.O. Box 646
Humboldt, NE 68376
(402) 862-2411

Weatherization Trust Inc.
2111 Douglas Street
Omaha, NE 68102
(402) 342-1611

POLICY COUNCIL Continued from page 1

"Nebraska energy consumers have a good opportunity to work together to help develop the state's first-ever energy policy plan." The working committees chose the following co-chairpersons to assist their activities and to participate on the Executive Committee:

| | | |
|---|---|---|
| ■ Alternative Fuels | Rod Gangwish | Shelton |
| | Gary Goldberg | Kearney |
| ■ Buildings | Ray Alvine | Omaha |
| | Jerry Berggren | Lincoln |
| ■ Electricity | Shelley Sahling | Lincoln |
| | Clint Johannes | Columbus |
| ■ Fossil Fuels | Tim Burke | Omaha |
| | Loren Hoekema | Sidney |
| ■ Waste to Energy | Robert Diffendal | Lincoln |
| | Doug Clark | Lincoln |

## The Plan Takes Shape

In May, all of the committees met in one or more day-long working sessions. They identified the issues in each topic area they felt should be part of a state energy plan.

The first draft of the plan — the result of their work in May — was evaluated by the entire group on June 7th in Lincoln. A sampling of the suggestions in each topic area include:

**Alternate Fuels** — Encourage and support the use of alternate transportation fuels including ethanol, compressed or liquified natural gas, propane, and electricity.

**Buildings** — Endorse the implementation and use of Energy Rated Homes™, a uniform, voluntary rating system to document the energy efficiency of homes including heating, air conditioning, lights, and appliances.

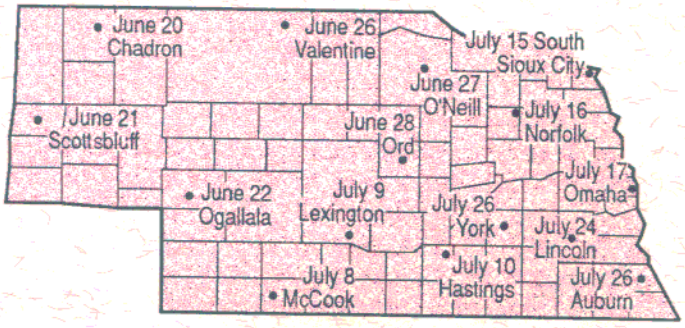
**Electricity** — Identify a combination of a full range of both supply-side and demand-side alternatives to achieve the most reliable electric service at the lowest reasonable cost in an environmentally responsible manner.

**Fossil Fuels** — Promote initiatives which reduce energy consumption and reduce the end cost of energy for the consumer.

**Waste-to-Energy** — Affirm the hierarchy of solid waste management established by the U.S. Environmental Protection Agency of reduce, reuse, recycle, burn, and bury.

## Regional Meetings

Starting June 20th in Chadron and ending 14 meetings later on July 26 in York, the first draft of the plan will be




reviewed by approximately 2,000 Nebraskans.

Following the regional meetings, the full Council plans to meet on August 16th in Lincoln — for the third time — to incorporate the suggestions or make modifications offered by people at the regional meetings. The revised draft will be offered for public review in September.

LOANS Continued from page 1

wagons. Approximately one-half of these energy saving improvements will reduce farmers' use of electricity.

On most proposed agricultural energy saving projects, energy audits or documented energy savings assessments need to be performed prior to receiving loan approval from the Energy Office. Most agricultural projects are not on the list of typical improvements which are pre-approved based on certain minimum standards. Potential borrowers or lenders should check with **Kirk Conger or John Osterman of the Energy Office** regarding these types of potential improvements.

### Loans Through Year 2000

Even though 71.4% of the original $1 million designated for the agricultural sector has been loaned to borrowers, an additional $277,025 remains. As designed, once the original oil overcharge funds have been borrowed, new loans would be financed from the repayments made on existing loans.

The Energy Office has approval from the federal government to continue to make loans until the year 2000. A number of factors, like the term of the loan and the amount of money provided by private lenders, will ultimately determine the total amount of loan funds available in this category for the ten year duration of the loan program.

*Over 190 Towns Effected...*

# Natural Gas Rate Increase Requests Blanket State

Not since the early to mid-1980s, have Nebraska's three largest investor-owned natural gas utilities asked for general rate increases simultaneously.

■ June, 1990, KN Energy requested a general rate increase in 147 communities in northeast, north, and south central Nebraska. Forty-six communities accepted the settlement offered by the utility or passed the original proposal. The remaining 101 communities were sued in Lancaster County District Court because they adopted lower rates than those proposed by the utility. The court case commenced on May 13th and ended two weeks later. A decision on the lawsuit is expected around June 26th. Either party could appeal the decision of the district court to the Nebraska Supreme Court.

■ In May, 1991, Minnegasco requested a general rate increase of 5.6% in 60 eastern Nebraska communities. The communities have organized themselves and hired a rate consultant to analyze the filing. Local governing bodies should be making their decision on Minnegasco's proposal around November 1st.

■ Peoples Natural Gas Company has notified 33 of the 41 communities it serves in the eastern part of the state that it will be filing a general rate request on August 1st. The amount of the proposed rate increase is not known at this time.

### Unique Form of Regulation

Nebraska is unique — not only in its unicameral legislative structure — but in how retail natural gas rates are regulated as well. It stands alone among the states in delegating all rate setting authority to village boards and city councils. In these 240 communities, it's the elected leaders who will be making — or have made — the decisions that effect ratepayers in each of their towns. And those decisions will remain in effect until either the municipality or the utility requests a change in those rates.

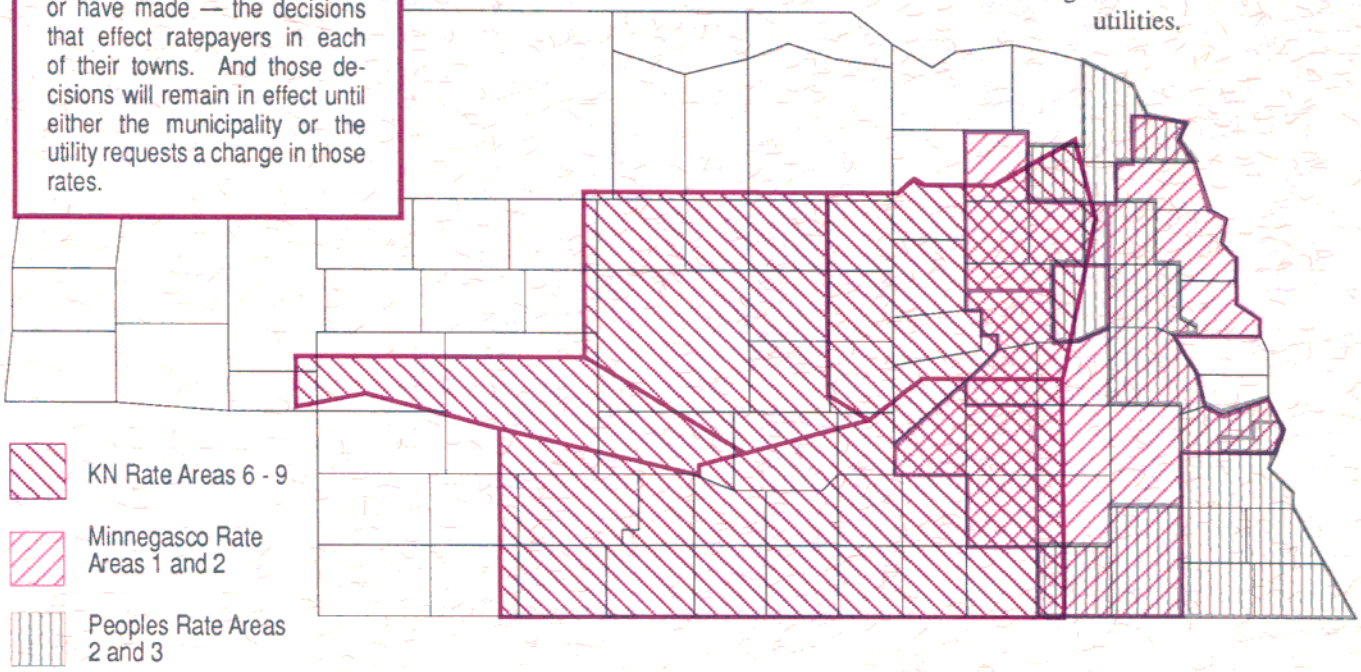
### The Rest of the State

Only four towns served by Northwestern Public Service, two served by Iowa Public Service and 44 KN Energy towns in the state's panhandle and southwest corner have been spared in the most recent filings. Approximately one-third of Nebraskans receive natural gas service from publicly-owned systems and are not subject to regulation under state statutes. The remaining 190 towns and villages do not have access to natural gas service.

### The Energy Office's Role

The Legislature directed the Energy Office to provide technical assistance to communities which regulate natural gas rates. Additionally, the agency administers the Municipal Natural Gas Revolving Fund which finances a community's natural gas rate regulation. As part of its duties, the agency assists locally elected and appointed staff through the regulatory process, provides assistance where needed, keeps them updated on the status of their particular rate request, and offers workshops on regulatory issues. In Nebraska, water, sewer, and electric systems are publicly-owned, so elected officials are unfamiliar with some of the regulatory issues involving investor-owned utilities.

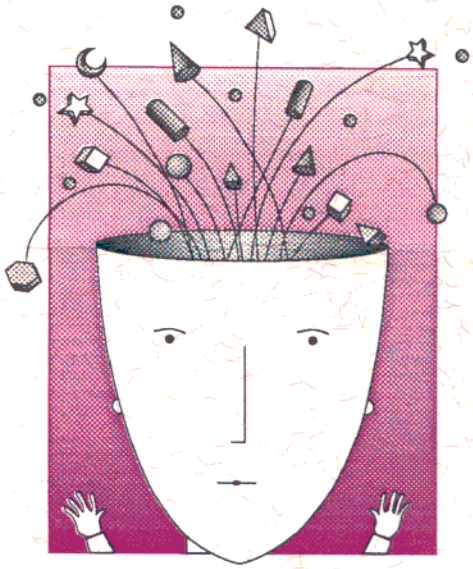
**Areas Where Natural Gas Rate Increases Are Pending**



*Up to $50,000 for Inventors, Creators, and Tinkerers...*

# Apply for Energy Invention Grants

Earlier this year, applications for Energy Invention Grants became available. To be eligible for a grant, the applicant must be a resident of the state or a small business without access to other types of funding. Grants are limited to a maximum of $50,000. To receive funding, the invention must be a new idea or application which will produce a direct and measurable savings of a non-renewable, metered energy source. The savings may be realized by reducing consumption, improving efficiency, or replacing the non-renewable energy source with a renewable one. Feasibility studies, educational programs, data collection, and demonstrations of existing technology are **NOT** eligible for grants.



Grants are funded with $500,000 in *Stripper Well* petroleum violation escrow funds. The grant program will operate until the amount of funds are exhausted.

## How To Apply

**Contact the Energy Office and request a one-page Energy Invention Grant Preapplication.** Applications are accepted continuously. On receipt and review of the Preapplication, if it appears the project is eligible, completion of a formal application will be required. The Energy Office makes the final decision regarding funding and the dollar amount of the grant.

## Confidentiality and Patents

Any proprietary information included in the applications, contracts, or reports will not be published, but the agency cannot guarantee confidentiality. Any grant recipient must identify any information which is deemed to be confidential in nature. The Energy Office does reserve the right to limit any claim of confidentiality. Any rights, licenses, or patents involving the invention remain the property of the applicant.

*Savings Potential in the Millions of Dollars Annually....*

# Crop Rotation Saves Energy and Fertilizer

Researchers at the University of Nebraska Institute of Agriculture and Natural Resources (IANR) and a group of eastern Nebraska farmers recently demonstrated that a significant reduction in agricultural energy use can be achieved with proper fertilizer management practices. The agronomists and farmers cooperated in an on-site program examining crop yield response to nitrogen fertilizer in crop rotations during 1988-1990.

Crop rotation is the ordered sequence of crops that revolve over a number of years to obtain a production advantage. The objective of this project was to demonstrate that rotation of corn or sorghum with legumes — soybeans, alfalfa, or clovers — would substantially reduce the need for applied nitrogen fertilizer. Legumes fix atmospheric nitrogen and subsequently release this to succeeding cereal crops.

Nitrogen fertilizer, the most widely applied fertilizer nutrient, is typically the second or third largest energy input in crop production. During July 1986 to June 1987, 1.1 million tons of nitrogen fertilizer were purchased for Nebraska crops.

Standard fertilizer rates can promote excessive application of nitrogen by ignoring climatic conditions, anticipated yield, or other variables. This is especially true during the dry growing seasons that occurred in 1988-89. Application of nitrogen fertilizer can increase yields only if soil nitrogen is insufficient. While a carefully chosen amount of applied fertilizer may be beneficial and profitable, higher levels are not always better. With each increasing level of fertilizer application, there will be a decrease in efficiency of use. Researchers determined that nitrogen application requirements should be based on residual nitrate, attainable yield, and previous crops.

## Cereal Crop Rotations

Over 80 experiments were conducted on 38 farms during the three year project. Soil samples showed an average of 50% — or 52 lbs. of nitrogen/acre — of the nitrogen requirements were met by the residual nitrate to a depth of three feet. Additional data collected during this period indicated that an average of 36 lbs. of nitrogen/acre were saved by rotations of corn or sorghum with legumes or other cereal crops. If 50% of the state's seven million acres in continuous corn production were grown in rotation with legumes, the IANR estimates that 88 million pounds of nitrogen — the equivalent of 350,000 barrels of oil — per

*Continued on Page 7*

CROP ROTATION SAVES ENERGY Continued From Page 6

year could be saved. At 12 cents per pound, savings would total $10.5 million annually.

### Legume Rotations

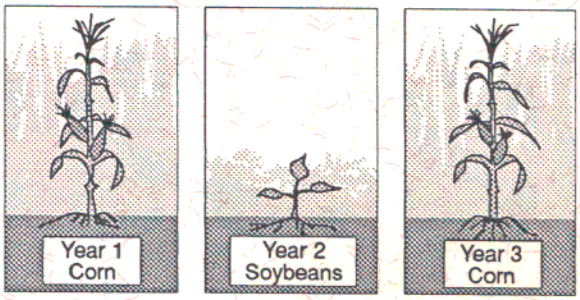
Soybeans are grown on approximately 2.5 million acres in the state. Data revealed that corn or sorghum planted after soybeans reduces the nitrogen fertilizer requirements by 50-70 lbs. of nitrogen per acre — 125 million pounds per year or $15 million. The nitrogen savings for corn or sorghum planted in rotation on the 1.5 million acres devoted to alfalfa production would be 150 million pounds of nitrogen annually — $18 million yearly. Annual energy savings for both crop rotations would be 1.1 million barrels of oil.

### Yields Remain Constant

Low input farming is sometimes criticized because of a perceived reduction in yield. Results from this project indicated that crop rotation and decreased fertilizer application produced no significant changes in yield. The agronomic, economic, and energy analyses from these site experiments supported previous research conducted under highly controlled conditions on experiment stations.

CROP ROTATION SAVES ENERGY Continued From Column 1

Developing a combination of energy reducing inputs with minimal reductions in yield will determine the potential for significant energy conservation in the nation's agricultural production. Other benefits include improved soil properties, increased crop diversity, decreased nitrate and groundwater contamination, as well as reductions in disease, insect, and weed pressures.




For more information about energy and dollar savings that can be realized from rotating crops contact your nearest county extension office for Volume X, No. 13 of *Resource Efficient Farming in Nebraska.*

*Propane and Compressed Natural Gas...*

# Alternate Fueled Vehicles on the Rise

Dual-fueled vans and mini-buses which can run on propane, compressed natural gas, or traditional gasoline are starting to appear in Lexington, Ogallala, Neligh, and Chappell and other cities and counties across the state.

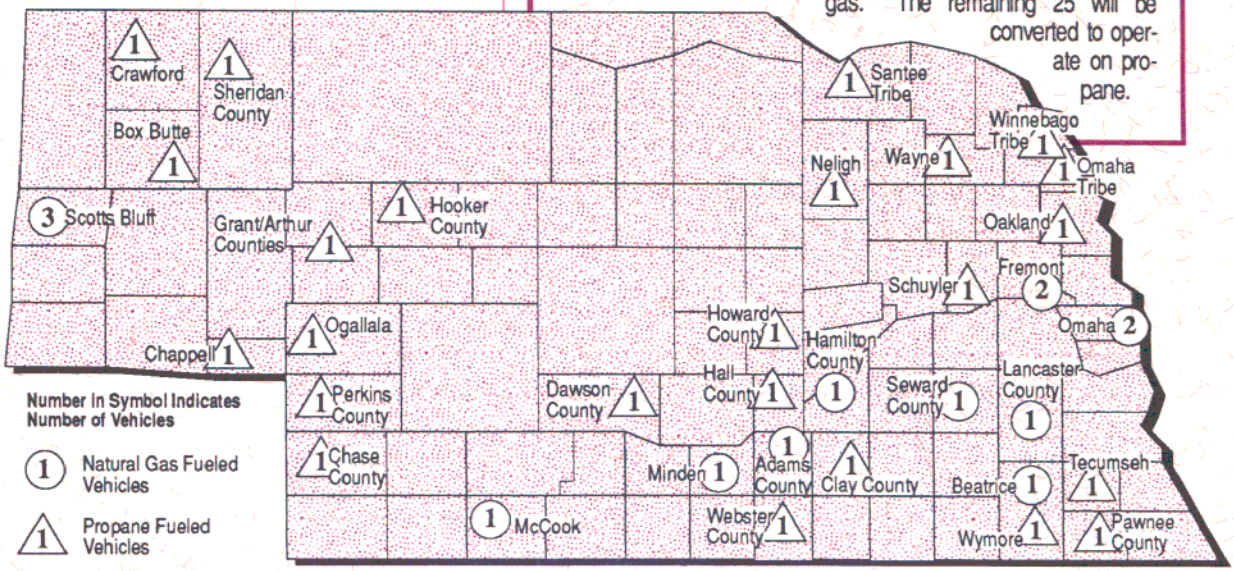
Total cost of the vehicle replacement project is $1.16 million. The Energy Office will be contributing $221,600 in petroleum violation escrow funds and rural transit systems will pay $55,400 toward the costs of these vehicles.

Three natural gas utilities — Minnegasco, KN Energy, and the Fremont Municipal Utilities System — will provide refueling facilities or funds to support the project with an estimated contribution of $54,000.

### U.S. Grant Helps With Purchase

In 1990, the state received an $831,000 grant from the U.S. Department of Transportation's Urban Mass Transit Authority to purchase 39 dual-fueled vehicles. The small buses, vans and station wagons are targeted for use by 30 rural transit systems and three native American tribes. Fourteen of the vehicles will be converted to operate on compressed natural gas. The remaining 25 will be converted to operate on propane.

### Alternate Fueled Vehicle Locations



STUDENTS HONORED Continued from page 2

### How to Be Selected Next Year

Nominations for the Energy Honors Program need to be submitted by a student's high school science teacher. **Applications can be obtained from Jim Woodland at the Nebraska Department of Education, P.O. Box 94987, 301 Centennial Mall South, Lincoln, NE 68509-4987 or phone (402) 471-4329.** Applications for the 1992 Energy Honors Program will be due in mid-March. Only incoming or graduating seniors are eligible. To be selected, students must have excelled in science and math training and other science related activities or honors. Recommendations from the student's science teachers are desirable.

### Teachers Can Win, Too

The U.S. Department of Energy also offers teacher research appointments to any of its 19 energy laboratories and technology centers for instructors of astronomy, biology, chemistry, computer science, earth science, mathematics, physics, agriculture, engineering and technology, materials science, and medical science. Nebraska's 1991 Energy Teacher Research Associate is Viki J. Hughes, a natural sciences instructor at Tekamah-Herman High School. She has been assigned to a research project at Lawrence Berkeley Laboratory in Berkeley, CA.

The Teacher Research Associate program is designed for outstanding junior and senior high teachers who want to enhance their leadership skills and increase their understanding and awareness of current science and technology. Appointments are for eight weeks with research activities constituting 80% of the assignment time. Teachers are paired with professional researchers conducting the work. Examples of typical research areas are:

- Materials Science: glass, ceramics, metals, polymers, and superconductors
- Nuclear chemistry of transuranium elements
- Biological catalysts for energy production
- Climatic effects of $CO_2$ and other greenhouse gases
- Computational seismic analysis
- Particle astrophysics: dark matter, supernovas, and cosmic microwave background
- Cell membrane transport
- DNA cloning and sequencing
- Energy-efficient lighting
- Development of high-temperature superconducting materials
- Elementary particle physics
- Oxidative damage in biological systems
- Scanning tunneling microscopy
- Ecological studies of wet and arid lands

Stipends, housing and travel allowances, and graduate credits are available. Interested teachers should contact Jim Woodland at the address listed above for more information.

*Answers to Your Questions...*

# Energy Information Services

The U.S. Department of Energy offers four different energy information services available to the public. They are:

**CAREIRS** The Conservation and Renewable Energy Inquiry and Referral Service answers questions at no charge. **(800) 523-2929**
Renewable Energy Information
P.O. Box 8900
Silver Spring, MD 20907

CAREIRS is now offering two new free publications, *Sources of Solar and Energy Efficient House Plans* (SS101) and *Energy Efficient Factory Built Houses* (FS222).

**NATAS** The National Appropriate Technology Assistance Service offers free tailored technical and commercialization assistance. **(800) 428-2525**
NATAS
U.S. Dept. of Energy
P.O. Box 2525
Butte, MT 59702-2525

**SERI/TIS** The Solar Energy Research Institute/Technical Inquiry Service offers technical solar information for scientific and industrial professionals. **(303) 231-7303**
Technical Information Service
Solar Energy Research Inst.
1617 Cole Blvd.
Golden, CO 80401

**NEIC** The National Energy Information Center in the Energy Information Administration provides data and projections on energy production, consumption, prices, and supplies. **(202) 586-8800**
Nat'l Energy Info. Center
U.S. Dept. of Energy
Forrestal Bldg., EI-22
Room 1F048
1000 Independence Ave., S.W.
Washington, D.C. 20585

This material was prepared with the support of the U.S. Department of Energy (DOE) Grant No. DE-FG47-80CS69109. However, any opinions, findings, conclusions, or recommendations expressed herein are those of the author and do not necessarily reflect the views of DOE.

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