

Classes 5 and 4, Where Are You?

Wind Power No Longer Blowing in Circles

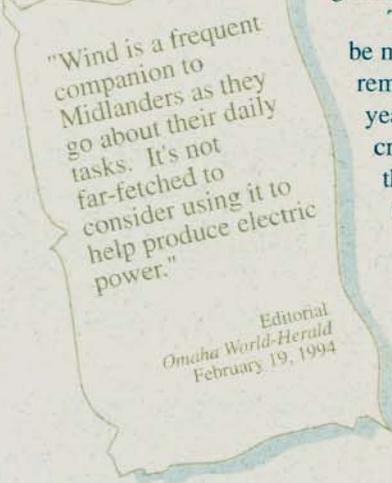
Roger Welsh, in *Shingling the Fog and Other Plains Lies* recounts the tale of a folklorist from Indiana who once asked him why Nebraska barns never had wind vanes since most the barns east of the Mississippi did. Welsh, in turn, asked a seasoned farmer who replied, "No sense to it. When you want to see which way the wind is blowing, you just look out the window and see which way the barn is leaning."

In Nebraska, people talk about the weather — and, in particular, the wind. It is a fact of life on the Great Plains and Nebraskans have learned to adjust, even brag, about the wind. Now, it looks like Nebraskans will have a new story to tell about wind as the state's largest electric utilities have initiated two different studies to find the most suitable sites in the state for constructing electricity-producing wind turbines. Before long this resource could be tapped to heat

and cool homes and power irrigation systems.
Does Ainsworth Measure Up?

A proposal from Nebraska Public Power District and KBR Rural Public Power District was selected by a U.S. Department of Energy's Pacific Northwest Laboratory to be one of five participants in a federal wind power study. The utilities suggested a site near Ainsworth because earlier wind studies found the area to have good potential for wind generation in the summer, when the state's electricity need is greatest. The site is also located close to an existing transmission system — an important cost consideration if the site is developed.

The site is located 5 1/2 miles south of Ainsworth on land owned by KBR. The goal of the federal study is to characterize wind speed and turbulence — both factors in successfully siting a wind generator.



The monitoring devices will be mounted on two towers and remain in place for about one year. During the study, NPPD crews will periodically collect the data and send it to the federal laboratory for analysis. At the conclusion of the study, the state's electric utilities will have access to the information gathered at the Ainsworth site.

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More Sites Around the State

Over the next four years, the Nebraska Power Association will coordinate, and partially finance, wind power studies at eight different sites.

A task force of eight people — three from the Nebraska Power Association, two energy analysts, one from the public, and two from state government agencies (the Energy Office and Economic Development are the two)— will identify at least 16 of the most promising sites based on previous studies and other factors such as proximity to existing transmission lines. By mid-August, a contractor will be selected to perform wind studies at eight of the most promising sites. The monitoring and evaluation is expected to start by early 1995 and conclude three years later in 1998.

Also as part of the site studies, the environmental impacts of each site will be chronicled, including bird concentrations and flyways, environmentally sensitive areas, and local, state and federal parks. Lastly, the site study analysis will prioritize wind site locations for development. ■

The Wind Energy Site Study Task Force

The Wind Energy Site Study Task Force meets periodically to oversee the statewide wind energy resource assessment. The meetings are open to the public. If you are interested in attending any of the meetings, please contact a member of the task force.

"If wind power holds any potential for Nebraska, it would be nice to know that before the next generation of power plant construction begins."

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Lincoln Journal-Star
November 11, 1993*

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Nebraska Average Annual Wind Speed

The energy contained in wind is expressed in terms of wind power classes, ranging from class 1 (the least energy) to class 7 (the greatest). In Nebraska, winds above class 5 are not present. Each wind class is based on a range of average wind speeds at specified heights above the ground. In the same wind power class, the energy contained in the winds at 30 meters above the ground is 60 percent greater than the energy in the wind at 10 meters. At most U.S. weather stations, wind data are taken about 10 meters above the ground.

Nebraska Annual Average Wind Power



Radioactive Waste in New Mexico?

Searching for a Home for Spent Nuclear Fuel

The recent announcement by the state's two largest electric utilities, Nebraska and Omaha Public Power Districts, that they have joined with 30-plus other utilities across the nation to explore construction of a private high-level nuclear storage facility on Apache tribal land in New Mexico brought to light the other side of the nuclear waste coin.

Up to now, Nebraskans have primarily focused on the possible construction of a storage facility for low-level nuclear waste in Boyd County in northeast Nebraska. The structure, if built, would house low-level radioactive waste from nuclear power plants and a small amount of other radioactive waste from a five state region. The license needed to build the Boyd County facility is currently being reviewed by the state's Department of Environmental Quality.

Until 2003

But what about the spent radioactive nuclear fuel which produces the electricity and has a half-life of 100,000 years and poses a hazard for much longer. The 30-plus utilities are seeking storage of nuclear waste — spent fuel from their power plants — which is generally called high-level waste.

The two Nebraska utilities have on-site storage capacity for spent fuel rods until 2003, but other utilities aren't so fortunate. The nuclear power plant with the most pressing need for storage space is at the Prairie Island nuclear plant in Red Wing, near Minneapolis. Unless alternate storage for spent fuel can be located, it will likely close in 1995 and be decommissioned.

A Dozen Years Gone and Billions Spent

The search for a national permanent storage site for high-level radioactive waste began in 1982 with the passage of the *Nuclear Waste Policy Act*. The law established mechanisms, procedures, financing and deadlines for disposing of the nation's nuclear waste from civilian reactors. But, nothing has gone as

planned except for the funding — utilities and their ratepayers have been paying one-tenth of a cent per kilowatt-hour produced to finance the national repository. According to the U.S. Department of Energy, as of April of last year, \$6 billion had been collected from the utilities and \$3.2 billion had been spent.

First, the exhaustive scientific study of a number of potential sites did occur. Three sites were selected in 1986 — Deaf Smith County, Texas; Hanford, Washington; and Yucca Mountain, Nevada. Just one year later, Congress selected Yucca Mountain. If this site is unsuitable, then the selection process begins anew.

A New Mexico Vacation for the Waste?

Second, the law called for the creation of a temporary storage site if the permanent facility had not opened before on-site storage capacity was reached by the nation's nuclear power plants. According to *Nuclear Waste News*, the U.S. Department of Energy received 21 requests for feasibility studies for siting a temporary storage facility. Six feasibility grants were issued. One of those grants went to the Mescalero Apaches in New Mexico where the utilities now want to build a private temporary storage site. But, second stage funding for environmental studies of the potential sites was eliminated by Congress last year.

Third, the law called for the permanent storage facility to open by 1998. The federal energy agency now says it will be lucky to open the facility by 2010 — seven years after the Nebraska plants exhaust their storage capacity.

That brings us back to the Nebraska utilities and their search for storage they'll need in nine years. The 33 utilities seeking to build a temporary storage site were expected to have cost estimates and a schedule in hand in June. Some time later, the utilities will decide whether or not to proceed. New Mexico's governor and congressional delegation are strongly opposed to the proposed storage facility the utilities would like to build in their state. ■

August 1, 1872

The first long distance pipeline for natural gas was completed. It was a two-inch pipe, five miles in length and extended from Newton Wells to Titusville in Pennsylvania.

August 25th — September 5th...

The Nebraska State Fair is 125!

The Nebraska State Fair is celebrating its 125th anniversary in 1994 and plans are underway for a truly grand event. Earthbound, the environmental celebration of the state's natural resources — water, land, air, energy and wildlife — will be returning after last year's debut.

New events for this year include a health fair housed in the Earthbound area along with chautauqua events sponsored by the Nebraska Humanities Council, arts and crafts events, a Mexican circus and children's shows. Mark your calendars for this extravaganza since, in a break with tradition, the Fair starts a week early. ■



Information for Local Officials...

Making the Right Energy and Environmental Choices

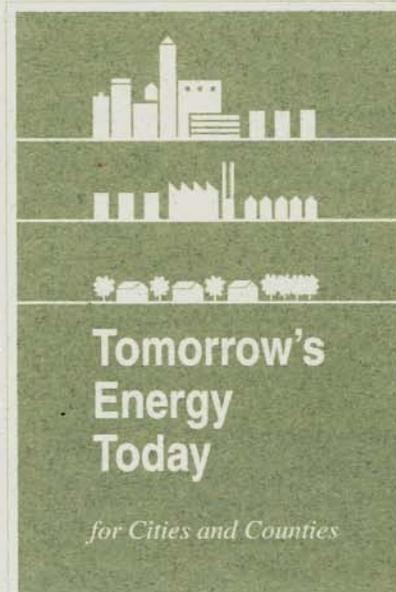
From buying city vehicles to saving money on the city's energy bills and water or waste water systems, a series of brief, non-technical fact sheets is now available to assist local officials in making wise, cost-effective, dollar-saving decisions on city-owned energy-using systems.

- **The Clean Air Act: What It Means for Municipal Fleets** — While most towns in Nebraska are exempt from the *Clean Air Act*, this is a good primer on the law's implications for affected cities. Two Nebraska cities — Lincoln and Fremont — are already making modifications in their municipal fleets even though none may be specifically required.
- **Catch a Cleaner Bus** — The cover story in the Spring issue of the *Energy Quarterly* illustrates the future in both rural and urban transit vehicles and the fuels needed to operate them. The paths five different areas — Chattanooga, Houston, Miami, Manistee County in Michigan and Peoria — have taken on fueling transit systems is contained in this brochure.
- **Cooling Our Cities** — Planting trees is an attractive strategy both for saving money through energy efficiency and for improving the quality of life in urban areas of any size. While a tree planting program in Tucson is highlighted, potential energy savings and environmental benefits are applicable to all cities and towns.
- **When Disaster Strikes, the Sun Can Still Shine Through** — This is a case study on Hurricane Andrew — how solar energy options can be utilized when power systems are damaged as a result of a disaster and how solar-powered energy resources can add a new dimension to local governments' disaster relief plans.
- **Buildings That Save Money with Efficient Lighting** — Energy-efficient lighting is one of the most cost-effective options available to local government officials for reducing energy costs in their buildings. Nebraska state government, as a part of EPA's Greelights program, is surveying all state buildings and replacing lights and other fixtures where cost savings are evident. Once completed, the state expects to save an estimated \$413,000 every year. This brochure highlights similar efforts in other cities.
- **Energy Dollars Relieve Municipal Budgets** — In these days of budget cuts, federal mandates, ballot initiatives and lids, some cities and towns are looking at reducing energy costs to relieve pressure on their budgets. This piece highlights how a

city is saving on its number two expense — energy — by using energy accounting and management systems.

- **Energy Efficiency Strengthens Local Economies** — A close-up of a small Iowa town's success in using its municipally-owned utility to stimulate the local economy. Osage, population 3,700, has a per capita electricity consumption 25 percent less than the rest of Iowa and has reduced electric rates 19 percent over the past eight years and natural gas rates by five percent in the last five years.
- **Linking Energy Use and City Planning** — By considering energy in urban planning, city officials can improve the quality of life in their cities while providing significant dollar savings to government, residents and local businesses.
- **Solar Access: A Winning Strategy** — A local government's decision to protect solar access — a building's access to direct sunlight — can have far-reaching benefits for developers, home buyers and the community.
- **Alternative Wastewater Treatment: Advanced Integrated Pond Systems** — Advanced in concept and simple in design, this new wastewater treatment technology may offer a solution for communities beset by intensifying cost constraints and water quality regulations. The system is ideal for communities with two to ten thousand people.
- **Cities Cut Water System Energy Costs** — Water distribution can be the largest single energy expense for cities and towns. Now, microprocessor-based technology which improves a city's water system can also reduce the town's energy bill enough to pay for the new system in about a year.

Any of these publications can be obtained either through **Nebraska On-Line** located under "News Services" or from the **National Renewable Energy Laboratory**, Technical Information Service, 1617 Cole Boulevard, Golden, Colorado 80401-3393; phone (303)275-4080. ■



June 8, 1953

The first gas turbine, propane-fueled locomotive was placed in service by the Union Pacific Railroad (headquartered in Omaha). The locomotive, which developed 4,800 horsepower, was used to haul freight between Los Angeles and Las Vegas.

The Feds Want to Work FOR You...

Growing Opportunities for Small Businesses

Small businesses are the major source of job creation, economic growth and technological dynamism in our economy. Current technology policies create opportunities for federal agencies to assist American industrial competitiveness and job creation.

One of the U. S. Department of Energy's highest priorities is to work with existing public and private businesses. Through direct funding, procurement opportunities and technology partnerships, the Department of Energy is committed to providing assistance for small businesses across the nation.

"The state's Energy Office has been very successful in accessing federal government research facilities for the benefit of Nebraska's business community," said Bob Harris, Director of the Energy Office. "Any business can contact the federal officials listed below to assist them through the process."

The federal energy agency's research facilities offer valuable and often unique expertise in:

- advanced materials and manufacturing
- high performance computing
- microelectronics
- environmental technologies

Small Business Partnerships

The federal energy agency offers many options to advance innovative ideas from small businesses. In addition to the contacts listed in the box below, **Daniel Williams**, Associate Laboratory Director for Planning and Technology Applications, Ames Laboratory, Iowa State University, Room 123, O & L Building, Ames, Iowa 50011-3020, Phone (515) 294-2635, Fax (515) 294-3751 or **Dana Moran**, Technology Transfer Office, National Renewable Energy Laboratory, 1617 Cole Boulevard, Golden, Colorado 80401, Phone (303) 231-7115, Fax (303) 231-1997 can provide additional assistance to Nebraska companies. ■

Small Business Help Centers

Small Business Innovation Research Program

This program funds research grant applications in selected areas from small businesses. The purpose is to increase private sector commercialization of technology developed through federal research and development efforts. Contact **Bob Berger** at (301) 903-3054.

Small Business Technology Transfer Pilot Program

This three-year pilot effort funds cooperative research and development conducted jointly by a small business and a nonprofit research institution. Contact **Bob Berger** at (301) 903-3054.

Energy-Related Inventions Program

This joint program with the National Institute of Standards and Technology offers technical and financial assistance primarily to individual inventors and small companies. Contact **Terry Levinson** at (202) 586-1478.

Energy Research Laboratory Technology Transfer Program

This program supports cost-shared, quick-response cooperative research and development agreements with small businesses at 11 energy research laboratories. Contact **Brian O'Donnell** at (202) 586-3825.

Small Business Technology Integration Program

The program works with small businesses interested in advancing and applying or licensing innovative technologies for environmental restoration, site cleanup and waste management. Contact **Joseph Paladino** at (301) 903-7449.

Small Business Initiative Program

This program focuses on manufacturing and advanced-technology development segments of the small business community and provides technical assistance, cooperative research opportunities and access to technical facilities. Contact **Michael Snow** at (505) 845-4947.

The Office of Economic Impact and Diversity

This office works with energy-related small and historically underutilized businesses that could benefit from the transfer of new and emerging technologies. Contact **Gloria Smith** at (202) 586-8383.

Energy Analysis and Diagnostic Centers and Industrial Assessment Centers

These are located at 30 different educational institutions across the country. The Centers use the talents of engineering school faculty to direct the work of students to conduct energy audits or energy, waste and productivity assessments for small and medium-sized manufacturing plants. Clients must be within 150 miles of the Center; businesses must be involved in food, tobacco, textiles, apparel, lumber or wood, furniture and fixtures, paper, printing and publishing, chemicals, petroleum and coal, rubber and plastics, leather, stone, clay and glass, primary and fabricated metals, industrial machinery, electrical and electronics equipment, transportation, instruments and other miscellaneous industries; have less than \$75 million gross sales, 500 or fewer employees and annual energy bills less than \$1.75 million. Nearby Centers are located at Iowa State University in Ames, Kansas State University in Manhattan, and South Dakota State University in Brookings. Another may be established at the University of Nebraska in Lincoln in 1995. Contact the **Western Energy Analysis and Diagnostic Center**, University City Science Center, phone (215) 387-2255 for the Energy Analysis and Diagnostic Center nearest you.

Technology Transfer Mechanisms

Small businesses have a number of mechanisms available for developing collaborations with the Department of Energy:

- Technical assistance and consulting by laboratory personnel
- Cooperative research and development agreements
- Personnel exchanges
- Use of facility agreements
- Procurement contracts
- Grants
- Set-aside programs

Each partnership is different. The mechanisms listed here are only some of the means by which small business can reach the expertise and technology found within the Department of Energy. ■

Two More Students to Youth Science Camp...

Seven Students to Attend National Energy Labs

Seven Nebraska high school junior and seniors will participate in the U.S. Department of Energy's High School Science Student Honors Program at national research labs later this summer according to Governor Nelson.

The Governor named the following participants in the program. Alternates will participate in the event the winner is unable to attend.

Winner

Susan Keasling
Fremont Senior High School

Alternate

Argonne National Lab

Michael Arens
Keya Paha County High School

Lawrence Livermore National Lab

Jason Smith
Auburn High School

Kent Herzog
Omaha Central High School

National Synchrotron Light Source

Dion Dickman
Lincoln High School

Joseph Henning
Omaha North High School

Fermi National Accelerator Lab

Elizabeth Esch
Seward Senior High School

Timothy Peters
Creighton Prep High School

Lawrence Berkeley Lab

Christine Kostos
Omaha North High School

Nick Enlow
Gering Senior High School

Sandia National Lab

John Musser, Jr.
Stuart Public School

Kayleen Huebert
Omaha North High School

Winner

Melissa Nicklin
Omaha North High School

Alternate

Oak Ridge National Lab

Jason Sutton
Garden County High School

"This is a tremendous opportunity for high school juniors and seniors," said Governor Nelson. "These students will not only study with other outstanding science students, they will also get to participate in cutting-edge scientific research."

According to the Energy Office, the students were recommended to the Governor by a panel of educators and energy professionals who reviewed all the applications. The application and selection process was coordinated by the state's Department of Education.

A Nine Year Tradition

This is the ninth year the federal energy agency has sponsored the program. Several thousand high school students from across the country have participated in the two-week study program since 1985.

Two students were also recommended to attend the National Youth Science Camp. They are Mary Nability of Central City High School and Garg Amit of Millard South High School.

Contact **Jim Woodland**, Nebraska Department of Education at (402) 471-4329 for more information about these summer science programs. ■

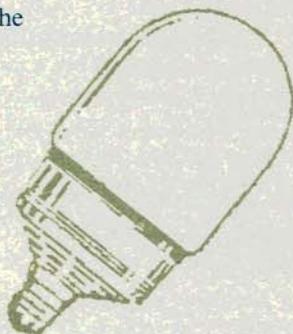


Water, Oil, Nuclear, Natural Gas and Now...

Electricity From What?

A regional biomass conference, *Renewable Electricity — Farming an Energy Crop for Rural Economic Development*, will be held in Nebraska City on July 27. The Lied Conference Center, with its integrated wood fuel energy plant, will be the site of the one-day event.

According to the conference's organizer, Wenona Hauter of the Union of Concerned Scientists, national and local speakers will discuss biomass resources and the possibility of using energy crops as a fuel for electricity production. The potential



impact on the state's rural economies will also be examined.

The other sponsors of the renewable electricity conference are Citizen Action, the Energy Office, U.S. Department of Energy, Nebraska Farmers Union, Sierra Club and the Sustainable Energy and Economic Development or SEED Campaign. ■

August 21, 1923

Forty-two landing fields on the Chicago-Iowa City-Omaha-North Platte-Cheyenne route were first lit by electricity. Thirty six-inch electric arc signals were used. The lights were visible for 50 miles.

What Happens When ALL the Lights Go Out?

During the afternoon and evening of April 11th, a spring storm dumped up to a foot of wet heavy snow on western and central Nebraska. Electric transmission and distribution lines soon became encased in a thick coating of ice and snow.

Electrical lines and poles snapped in the high winds that followed. This was the beginning of a disaster emergency where many residents of central Nebraska would be without electricity in their homes for weeks. Restoration of electricity for agricultural purposes would take even longer — over two months in some cases.

Twice in Less Than a Year

This was the second time since July 1993 that the Energy Office became part of a team formed to manage a disaster emergency. The July 1993 disaster emergency was caused by gale force winds and flooding. In each instance, the Energy Office played a pivotal role in obtaining information on areas without power, preliminary estimates of damage to electric utility systems in the affected areas, estimated schedules for restoration of power to customers and the need for special assistance by utilities.

Headquartered at the Grand Island Emergency Operations Center, the emergency management team consisted of members from the Governor's Office, Civil Defense, the American Red Cross, the Nebraska Departments of Agriculture, Social Services, Health, Roads, Aging, the Energy Office, National Guard and federal Department of Agriculture.

"We must accurately determine the needs of those affected by the storm," said Governor Ben Nelson. "If there is a need for

federal assistance in the recovery process, we will do what we can to see that the appropriate assistance is granted."

34 Utilities Damaged

Each of the 24 municipal utilities and ten rural electric systems serving the 18 county disaster area was contacted by Energy Office disaster staff for information. Preliminary damage estimates were compiled. Reports on areas without electric power and expected restoration schedules were updated daily.

Progress on restoring power was the most critical information. For example, the National Guard placed generators in schools in communities without power and the Red Cross set up shelters where needed. The Agricultural Soil Conservation Service coordinated the placement of generators with farmers.

Heaviest damage was concentrated in rural areas. In the counties hardest hit by the storm, agricultural prospects were bleak. Irrigation places heavy loads on utility systems and substantial repairs would be needed before the high summer electrical use could be accommodated. In the worst cases, this could take until July 1st. Substantial crop damage could occur if dry weather set in before then — assuming the crops had been planted. Electricity was also needed to move the center pivot systems out of the way so fields could be planted. Apart from the loss of electricity, some planting was delayed until poles and lines on the ground could be cleared.

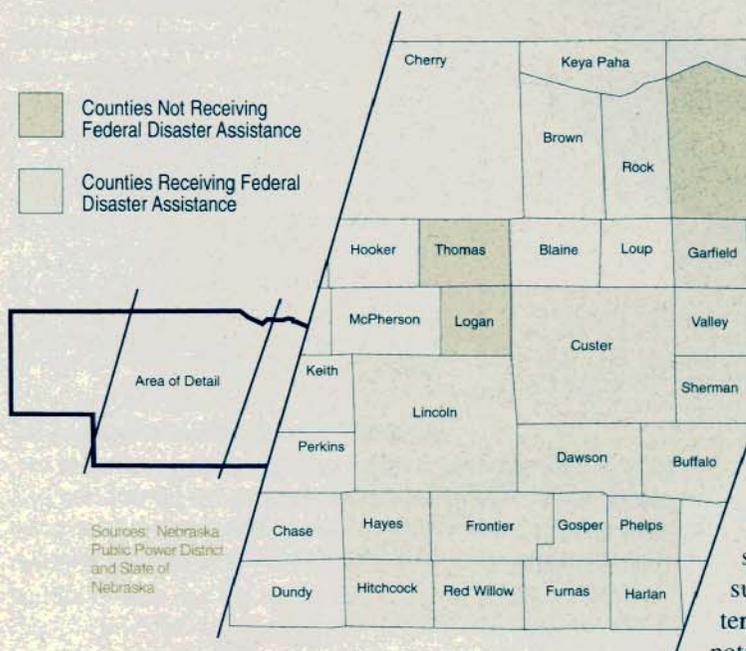
The Tab — \$52 Million

The \$52 million estimate of damages to public facilities which Governor Nelson submitted to the Federal Emergency Management Agency was composed largely of public utility damage. Since Nebraska is a public power state, electric utilities can be reimbursed by the federal government for 75 percent of their eligible repair costs. Governor Nelson's request for disaster aid included 20 counties. Of these, 15 (identified in the map at left) were recently approved to receive federal disaster aid.

Although the Energy Office's primary role in disaster emergencies is obtaining information on energy supplies, it does offer low interest loans for making energy saving improvements to buildings, systems and appliances. Loans are available on an expedited basis to residents whose appliances and other systems were damaged by power surges associated with this spring's disaster.

Fortunately, disaster emergencies do not occur frequently. However, the Energy Office continuously monitors conditions which are indicative of potential energy shortages. For example, diesel fuel outages may occur during times of heavy agricultural demand during spring planting, irrigation season and fall harvest. During the heating season, propane supplies are monitored. Limited supplies or outages at wholesale terminals are identified and producers are contacted so that a potential shortage to Nebraskans can be averted. ■

Areas of Nebraska Hit by April's Snow Storm



Frequently Asked Questions...

5% Dollar and Energy Saving Loans

The *Nebraska Energy Quarterly* features questions asked about 5% Dollar and Energy Saving Loans. Loan forms may be obtained from participating lenders or the Energy Office.

For some Nebraskans, air conditioners are a medical necessity. Can approval of loans for air conditioners be expedited in these situations?

During the summer, quick approval of loans for replacement of air conditioners, in certain situations, is standard procedure. If the unit has stopped working and air conditioning is necessary because of a medical condi-

tion, the lender should call or fax the information on both the old and new units to the Energy Office, as well as the reason for the emergency. If the new air conditioner meets performance requirements for the loan program, the Energy Office will contact the lender to authorize the installation of the replacement air conditioner. A letter from the borrower's physician is also

required to substantiate the borrower's medical condition.

Increasingly, I've seen news items on vehicles which operate on alternate fuels. What are these fuels and can I get a loan to purchase or convert my car to operate on them?

Alternate fuels, as defined by law, are ethanol, methanol, electricity, compressed or liquefied natural gas and

propane (others such as hydrogen or solar could be added later). Five percent loans are available for the purchase of new vehicles — cars, vans, buses or trucks — or the conversion of existing vehicles to operate on an alternate fuel. Loans for fueling facilities are also available. Call **Joel Phipps** or **Jody Johns** if you're interested in loans for alternate fuel vehicles. ■

50 Given in Five Areas...

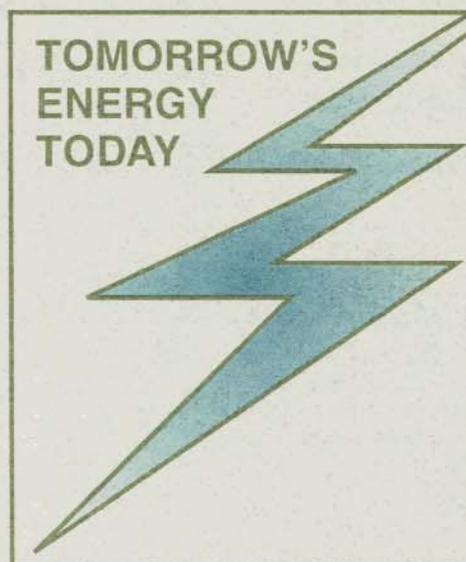
Three Nebraska Projects Win National Energy Awards

Three projects in Nebraska recently received 1994 national Energy Efficiency and Renewable Energy Special Recognition Awards presented by the U.S. Department of Energy. The three — Lincoln's ice storage and generating systems (*NEQ*, Winter 1992), Central Community College's Circuit Rider (*NEQ*, Spring 1993) and the Energy Office's five percent Dollar and Energy Saving Loans — received the awards in late April at a Washington, DC ceremony.

"Every advance we make developing and implementing such new technologies helps improve our global competitiveness and creates jobs for our citizens," said Energy Secretary Hazel O'Leary.

Nationally, 50 projects were selected for recognition. Projects in just six states garnered 40 percent of the awards. New York had four winners. Nebraska tied with Maryland, Oregon, Texas and Wisconsin with three winners each.

"The results achieved by those who received awards prove that energy efficiency and renewable energy technologies produce



practical benefits," said Christine Ervin, Assistant Secretary of Energy. "That means new jobs and businesses, more competitive industries and pocketbook savings for energy users in the country."

Projects were nominated by state-level energy offices in five categories — building, industrial, transportation, utility and energy technologies. An independent panel of energy and environmental experts judged the projects.

"We're extremely proud these Nebraska projects have been selected," said Bob Harris. "We want to encourage others to examine these projects and, if possible, use them in their own communities. By doing this, other towns can take the reins of energy efficiency and make a positive local impact."

To qualify for nomination, projects must have been operational for one year to allow for documentation of the projected energy savings or the program results. According to the federal energy agency, the projects selected to receive award recognition represented a cross-section of energy initiatives being undertaken around the nation. ■

New Home Construction...

Energy Efficiency Requirements Are On the Rise

Starting this year, some federal agencies are requiring higher energy efficiency standards in newly built homes for which they provide financing.

In Nebraska, it is estimated that up to 25 percent of all new homes — those financed through the U.S. Department of Housing and Urban Development, Farmers Home Administration or Veterans Administration — will be affected by the new requirements. More stringent energy standards are also being applied to new multifamily high rise structures financed by the three government agencies. The Energy Office reviewed six representative blueprints for new homes and found that the cost of the more stringent energy standards varied from no cost

increase to an increase of \$1,600. However, in most of the homes reviewed, the cost increase was under \$400. Estimated yearly savings on energy bills ranged from \$31 - \$476.

The building code changes were contained in the 1992 *Energy Policy Act*



and became effective in October 1993.

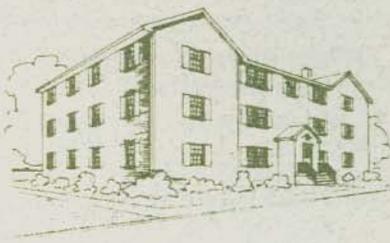
The New Standards

The law called for homes, townhomes and apartments financed by the federal government to meet or exceed the requirement of the Council of American Building Officials Model Energy Code 1992 (for homes and townhomes) and, in the case of high-rise apartments (four or more floors), the requirements of the American Society of Heating, Refrigerating and Air-Conditioning Engineers Standard 90.1-1989.

Currently, no city or state building code in Nebraska meets or exceeds these standards. The state standard is the 1983 Model Energy Code. Municipal codes in Omaha, Lincoln and Norfolk exceed the state code, but do not currently match the 1992 Model Energy Code now being required by the federal agencies.

State Revisions Coming?

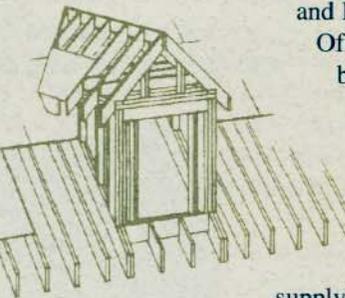
The *Energy Policy Act* did require states to review the provisions of their existing residential building codes regarding energy efficiency and consider changing them to meet or exceed the 1992 Model Energy Code. However, upgrading existing building codes was not required. Any state could decline to change their codes as long as the reasons were submitted to the U.S. Department of Energy.



To acquaint the state's home builders with the new building code requirements, the Energy Office met with local groups of builders in Lincoln, Omaha, Columbus and Kearney in April. In July, Energy Office staff will also meet with builders in Ogallala and Scottsbluff/Gering. For more information about these upcoming meetings, contact

Lynn Chamberlin or **Kirk Conger** in the Energy Office.

The agency, at no cost, is supplying any builder in the state with computer software (and instructions on using the software) created by the Department of Housing and Urban Development which can analyze building plans and identify the changes required to comply with the 1992 Model Energy Code.



Summers are for Studies

During the recent legislative session, state senators agreed to analyze the impact of the *Energy Policy Act* on Nebraskans. The study, in part, will comply with the stipulation in the federal law requiring the state to examine its existing building code. A public hearing before the Natural Resources Committee on the issue will be held in the fall.

The New Codes And More Information

To obtain copies of the new residential building code being used by the Housing Department, Farmers Home Administration and the Veterans agency contact:

The Council of American Building Officials, 5203 Leesburg, Pike Falls Church, VA 22041, phone (703) 931-4533. Individual copies of the code cost \$10.

If you have questions regarding how the Department of Housing and Urban Development, Farmers Home Administration or the Veterans Administration are implementing the more stringent building codes in Nebraska, contact:

- **Rheta Johnson**, Department of Housing and Urban Development, Executive Tower Center, 10909 Mill Valley Road, Omaha, NE 68154-3955, phone (402) 492-3118
- **Ken Stadler**, Farmers Home Administration, 100 Centennial Mall North, Lincoln, NE 68508, Phone (402) 437-5575
- **Duane Viglicky** or **Grace Cooper**, Veterans Affairs, Regional Office, 5631 South 48th St., Lincoln, NE 68516, Phone (402) 437-5001. ■



Nebraska's Reliable, Low-Cost Energy Resource...

Hydropower — The State's First Source of Electricity Keeps on Flowing

Water-generated electricity has a long history in Nebraska. Towns located near rivers usually got their first experience with electricity from a hydropower plant located on the river's banks.

Today, electricity from in-state hydroelectric units produces, on average, less than five percent of the energy used by Nebraskans. Federally-owned hydropower imported from other states supplies an additional ten percent of the state's needs. Nationally, about ten percent of the electricity generated annually is produced by hydropower systems.

Historically, more than 40 percent of the all the hydroelectric power produced in a year occurs in just a four month period — from late spring through late summer, when the state's electric systems need additional power.

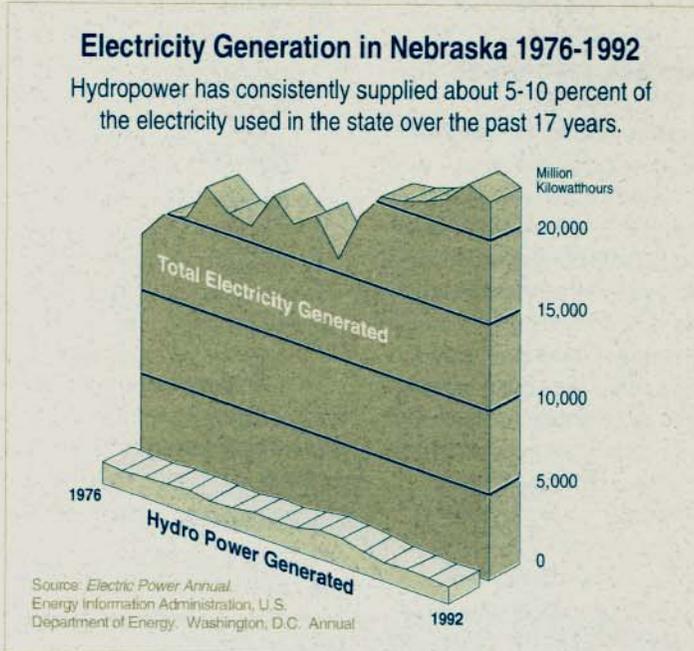
Over 30 years ago, nearly 20 percent of the electricity used by Nebraskans came from water. What's changed over the years is that the amount of electricity generated by water has remained relatively constant, but Nebraskans need for power has nearly doubled during that time.

The Big Three

The three largest hydro generating plants in the state or on its borders are Gavins Point on the Missouri, Columbus and Jeffrey Canyon on the Platte. Gavins Point, operated by the U.S. Corps of Engineers produced over 583,000 megawatthours of electricity in 1992 — enough to provide electricity for all or most of the homes in the state's third and fourth largest towns, Grand Island and Bellevue, for a year. However, only a portion of the power

Electricity Generation in Nebraska 1976-1992

Hydropower has consistently supplied about 5-10 percent of the electricity used in the state over the past 17 years.



Source: Electric Power Annual, Energy Information Administration, U.S. Department of Energy, Washington, D.C. Annual

produced at Gavins Point is used in the state. In 1992, the Columbus hydro plant, the largest producer in the state, generated enough electricity to fulfill the needs of about 11,000-14,000 homes. In 1992, Jeffrey Canyon produced enough electricity to provide service to about 8,100-10,000 homes for a year. In Nebraska, the typical homes uses between 8,300-10,800 kilowatthours every year.

Hydroelectric power plants use flowing water to spin a turbine connected to a generator. The hydro plants in the state use both a "falling water system" and a "run of the river system." In a "falling water

system," water is accumulated in reservoirs created by dams, then released through conduits to apply pressure against the turbine blades to drive the generator. In "run of the river systems" the force of the river current applied to the turbine blades produces electricity.

Cheap Federal Power

Most of the federal hydroelectric power which comes into the state originates to the north of Nebraska from dams on the upper Missouri River.

The power system is operated by Western Area Power Administration, which is one of several federal power marketing systems in the country. Western supplies hydropower in 16 predominately western states (except states in the northwest which are served by Bonneville Power Administration).

In 1993, Western supplied over 2 million megawatthours of hydropower to cities, publicly-owned utilities and state agencies at a cost of nearly \$36.3 million or 1.7¢ per kilowatthour. According to

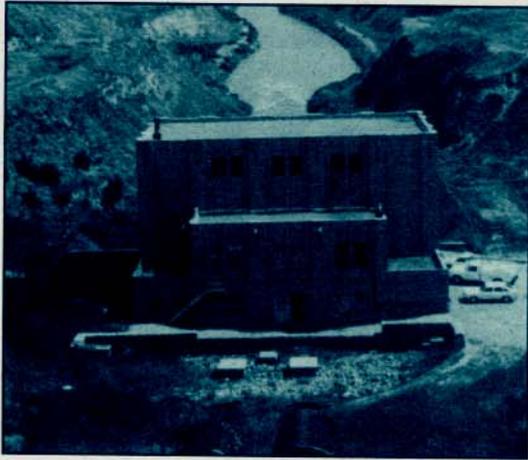
Hydro Power Generation in Megawatthours

Plant	1992 Mega-watthours
Central Nebraska Public Power and Irrigation Dist.	
Jeffrey Canyon	87,341
Johnson No. 1	54,484
Johnson No. 2	65,431
Kingsley	45,854
Nebraska Public Power District	
Columbus	120,151
Kearney	36
Minnechaduza	135
Monroe	23,919
North Platte	84,131
Spencer	9,432
Spalding	579
U.S. Corps of Engineers	
Gavins Point	583,953
Total	1,075,446

Nebraska Hydro Power Plants



Source: Electric Power Quarterly, Energy Information Administration, U.S. Department of Energy, Washington, D.C. Quarterly.



Jeffrey Canyon hydropower plant began operating in 1941.

Lincoln Electric System, one of Western's customers, the federal hydropower is about the same price as the 1.5¢ per kilowatt-hour power coming from a coal-powered plant in Wyoming, which was the most economical power plant in the country in 1991.

Western's largest customer in the state in 1993 — and eighth in their system — was Nebraska Public Power District. The utility received nearly 774 million kilowatt-hours and paid more than \$15 million for the electricity. Western's 19th largest customer in 1993 was Omaha Public Power District which received more than 400 million kilowatt-hours.

Across Nebraska, 46 cities, 8 state agencies — universities and state government buildings — and 3 public power districts receive federal hydropower.

Periodically in the past several years, Presidents have proposed selling several of the federal power marketing systems in their budgets submitted to Congress. However, Congress has routinely rejected these proposals. ■



In the Classroom...

600+ Teachers to Get Charged Up on Energy Issues

Energy topics — from current events to chemical, biological and physical interactions — and the teachers who present them to students in classrooms around the state are being given increased attention.

The Energy Office, in partnership with the state's Department of Education and the Mathematics and Science Initiative, will be providing energy education training for 600 teachers over the next several years.

Framed?

Energy is one of four "unifying threads" or themes in the Department of Education's Mathematics and Science Frameworks project. The other three themes are patterns of change, scale and structure and systems and interactions.

The goal of the project is to improve the quality of education through a systematic approach emphasizing connections with math, science and other disciplines.

Energy is a logical theme in science curriculum, since energy provides the basis for all types of interactions. Each individual theme is then integrated with the other three during the study of each content topic. A repetition of instruction is considered vital for conceptual learning according to current teaching theory.

Frameworks are based on nationally recognized standards in mathematics and science education. During the next phase of the three-year project, guidelines for the development of models and performance assessments for teacher education programs will be designed. In workshops this summer, Professional Development and Assessment Teams will present the new guidelines for local

teaching decisions. An estimated 200 teachers will participate in the training workshops.

For more information about the Department of Education's Frameworks project, contact **Catherine Wilcoxson**, phone (402) 471-2283.

Teachers Initiated in Energy

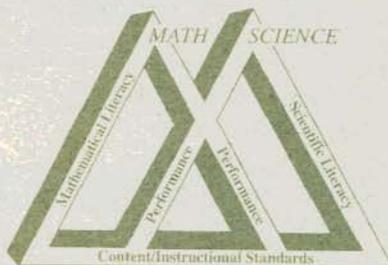
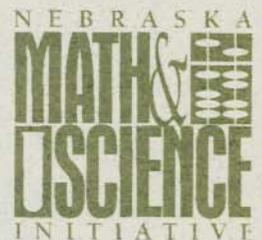
Teachers in the state will have another opportunity to receive curriculum and training on energy topics. The Nebraska Mathematics and Science Initiative is developing twenty model elementary energy curriculum modules and will provide training to teachers. The model energy curriculum will utilize elements of the Frameworks project.

Over 200 kindergarten through third grade teachers will be trained in the new energy curriculum during this summer. Next year, teachers in grades 4-6 will also receive similar training.

Scientific Summers

The Math and Science Initiative will also sponsor summer institutes for science and math teachers. At the science institute, teachers may attend a grant writing seminar to learn how to apply for funds for classroom projects from sources such as the Competitive Implementation Funds for Teaching Energy program. The Energy Office provided \$30,000 for innovative energy education projects. This is part of the \$500,000 in oil overcharge monies being used to match a \$5.3 million National Science Foundation grant received by the state to improve science and math education.

For more information about the energy portion of the Math and Science Initiative, contact **Suzanne Kirby**, Project Administrator, Nebraska Math and Science Initiative, University of Nebraska-Lincoln, Morrill Hall, Lincoln, NE 68588, phone (402) 472-9302. ■



Information Services and Resources

The **Alternative Fuels Hotline** provides general and specific information on alternate vehicular fuels including fuel performance and availability. Call between 9am-5pm CT, Monday-Friday. (800) 423-1363

Alternative Fuels Hotline
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Arlington, VA 22209

The **Energy Efficiency and Renewable Energy Clearinghouse** provides fact sheets, brochures, videos and publications on energy efficiency and renewable energy. Call between 7am-4pm CT, Monday-Friday. (800) 523-2929

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Two free fact sheets are available from the Clearinghouse — *Landscaping for Energy-Efficient Homes (FS220)* and *Energy-Efficient Factory-Built Houses (FS222)*. Please refer to the numbers in parentheses when ordering a publication.

The **Motor Challenge Information Clearinghouse** provides research, software, technical assistance and education materials on efficiency in electric motor systems. Call between 8am-7pm CT, Monday-Friday. (800) 862-2086

Motor Challenge Information Clearinghouse
P.O. Box 43171
Olympia, WA 98504-3171

The Energy Office has several new publications available — *1993 Annual Report* and *Nebraska Energy Statistics, 1960-1992*. Contact **Jerry Loos** in the Energy Office for copies.

The **National Energy Information Center** provides data and projections on energy production, consumption, prices and supplies. Call between 7am-4pm CT, Monday-Friday. (202) 586-8800

National Energy Information Center
U.S. Department of Energy
Forrestal Bldg., EI-22, Room 1F048
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Washington, D.C. 20585

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The **National Materials Exchange Network** provides free advice via computer modem on recycling and reducing disposal costs. Call 24 hours per day. Modem access (800) 858-6625 General assistance (509) 325-0507 ■



Nebraska's Biomass Energy Potential...

NU Study Says Energy Self-Sufficiency is Possible

A just-released 1990 study by three university researchers reports that enough biomass resources exist in Nebraska for the state to be self-sufficient in liquid fuels and electricity.

The summary, in part, states:

"Nebraska has the potential to be relatively energy self-sufficient in liquid fuels and electrical power. This goal of sufficiency must be tested for economic

viability before it is considered a policy goal. The use of harvestable residues for a combination of methanol synthesis and electrical power generation appears highly attractive. The production of ethanol from excess corn, sorghum residues and some contribution from sugar beets and other grains is also attractive."

Copies of the report, *Nebraska Survey of Biomass: Availability and Energy*

Utilization Potential, are available from **Jerry Loos** in the Energy Office.

The study was financed by

the Western Regional Biomass Energy Program operated by the U.S. Department of Energy. ■

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