

Nebraska Energy

Q U A R T E R L Y

A More Than Three-Year Tracking Effort...

First Two Months of Wind Speed Reports Encouraging

In the first report on wind speeds at eight monitoring sites, Springview and Imperial claimed the highest speeds in April and May, respectively. The sensors at Springview registered an average wind speed of 17.2 miles per hour in April. In May, the equipment on Imperial's tower logged average wind speeds of 16.6 miles per hour.

per hour threshold deemed desirable for efficient use of wind power technology.

However, spring is typically a windy season in Nebraska. At least 12 months of data are needed before reasonable estimates of wind turbine power production can be made.

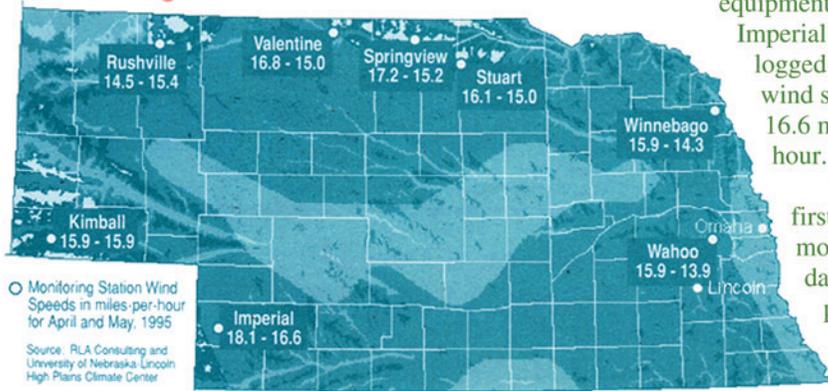
State's Weather A Culprit

In April, monitors located on eight towers across the state began recording wind speeds. Now, the first two months of data are available from monitors located highest on the towers. Sensing devices are mounted at 10, 25 and 40 meters above the ground. Typically, wind turbines are at least 40 meters above the ground, where the wind speed is undisturbed by surface irregularities such as trees and buildings.

RLA Consulting, the Washington-based firm conducting the survey, reported the state's notorious weather has taken its toll on the equipment. In the first three weeks, both icing conditions and wind disrupted data collection sensors and vanes at several locations failed. However, data is still being collected using backup sensing units.

The wind energy project is a joint effort of the state's electric utilities, public interest groups and the Energy Office. ■

Average Annual Wind Power in Nebraska



Imperial's tower logged average wind speeds of 16.6 miles per hour.

"The first two months of data looks pretty good, but let's

wait a year before we get too excited," said Larry Marquis, the wind energy task force chairman.

The lowest average speeds in April and May were registered at Rushville and Wahoo, 14.5 and 13.9, respectively. Future wind speed reports will be released on a quarterly basis after analysis.

All eight sites, so far, have met the minimum of 12 miles per hour needed for current wind technology. And all but one of the sites — Wahoo — met the 14 miles

Class 1 Energy contained in wind is expressed in terms of wind power classes, ranging from class 1 (the least energy) to class 7 (the greatest energy). 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 stronger than energy in the wind at 10 meters. At most U.S. weather stations, wind data are taken about ten meters above the ground.

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Some Nebraska Electric Ratepayers Save \$5 Million in 12 Years

Load Management Helping Keep Electric Bills Down

What is load management and how does it affect your electric bill? You may have heard it can save our city money, but how does load management work?

Load management is a complex system used by a utility in an effort to reduce its consumer's use of electricity (or load) when the city is at the time of maximum (peak) electrical usage.

The city of Bayard does not generate electricity; it buys power from outside sources, namely the Municipal Energy Agency of Nebraska (MEAN) and the Western Area Power Administration (WAPA). The price which our city pays for its electricity throughout the entire year is based on the day of Bayard's highest electrical use. If Bayard holds down its "peak" electrical consumption, then it can purchase electricity for you, the consumer, at a lower base rate. The city saves money initially, which takes a burden off the electric ratepayers' pocketbooks. In the long run, this system delays the building of expensive power plants, which in turn, keeps Bayard's electric rates low.

Load management was installed in Bayard in late 1993 by the Nebraska Municipal Power Pool. The load management system is run by a computer which monitors the city's electrical usage at all times. When Bayard's electric consumption nears the point of peak usage, city employees try to reduce the city's electrical loads. How can you help to cut the peak? You can help by just

turning up the thermostat on your air conditioner a few degrees or by using a fan and by not using large electrical loads at the same time, such as your oven, clothes dryer, and dishwasher, or by cooling your house earlier in the day, you too can see it on your monthly electric bill, but the benefits go beyond that. If we all help in this effort, the bills that the city pays to our power supplier can be reduced. This is what keeps our electric rates some of the lowest in the nation.

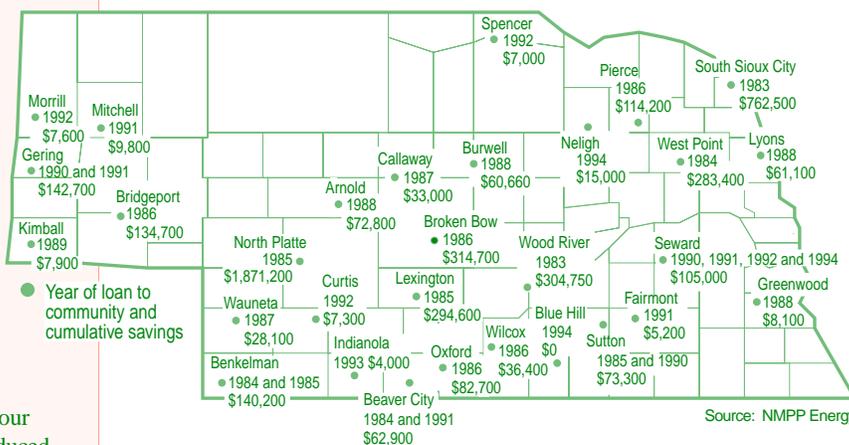
When the "peak" consumption of electrical usage starts to drop, the air conditioners and other equipment can gradually be turned on. The peak electrical usage is most likely to happen on a hot summer weekday, if it occurs, and all city loads are controlled, the city will blow the fire whistle to keep the "peak" load down on a hot summer afternoon. How can something this effortless save the city of Bayard any money at all? The city spent less than \$4,000 for the system and in about one year the system will have already saved Bayard over \$14,000. That's a pretty good investment by most standards. It allows your utility to control costs, therefore it helps to control all of the city-run utility rates.

Editorial, *Bayard Transcript*
March 1, 1995

As the accompanying *Bayard Transcript* editorial illustrates, Bayard residents are pocketing dollars because their local utility installed some very simple load management equipment two years ago.

But, Bayard's townsfolk aren't the only ones keeping dollars in their communities. In at least 30 other towns — from South Sioux City to Kimball — ratepayers have saved in excess of \$5 million since the systems have been installed.

Cumulative Savings of Communities Borrowing Electrical Load Management Resource Funds, 1983-1994



\$50,000 Goes A Long Way

Since 1983, when the Energy Office established a no-interest revolving loan fund at NMPP Energy with \$50,000 in oil overcharge trust funds, towns across the state have been borrowing money to finance the purchase of load management equipment. The load management program was one of the first uses of oil overcharge funds.

Because the loans are repaid, usually in the first year after installation of the equipment, new loans can be made using the same funds. Since the first loans were made to South Sioux City and Wood River, the \$50,000 has revolved eight times, financing more than \$400,000 in improvements to local electrical systems.

Oil overcharge trust funds have been received by Nebraska as a result of court settlements against oil companies which overcharged consumers during the period of price controls from 1973-1981.

Not all local utilities use the loan fund. Some municipally-owned electric systems use surplus revenues to finance the installation of load management equipment.

Small Towns, Big Savings

One of the smallest towns to receive a no-interest loan, Callaway (population 539), has saved its ratepayers \$33,000 in just eight years. North Platte, one of the larger towns in the state, received a loan in 1985 and has saved local residents more than \$1.87 million. Seward, one of the more ardent believers in load management has received four loans to finance the town's equipment.

For more information about NMPP Energy's no-interest loans for load management equipment, contact **Kevin Gaden** at 402-474-7459. Loans are available to Nebraska members of this utility organization. ■

National Energy Labs Continue Program...

Four Students Participate in Cutting Edge Research

Four Nebraska high school juniors and seniors will participate in the U.S. Department of Energy's High School Science Student Honors Program at four national research labs later this summer.

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

Winners

Alternates

Argonne National Laboratory

Nathaniel Cunningham
Lincoln Pius X High School

Nadir Ahmad
York High School

Fermi National Accelerator Laboratory

Timothy Peters
Omaha Creighton Prep School

Arthur Cunningham
Lincoln Pius X High School

Lawrence Berkeley Laboratory

Leah Johnson
Oakland-Craig High School

Sonal Saxena
Omaha Brownell-Talbot High School

Sandia National Laboratory

Natalie Senger
Beatrice High School

William Strasser
Omaha North High School

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.

This is the tenth 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 More Students to Camp

Two student delegates and two alternates to the national Youth Science Camp were also selected by the committee:

Delegates

Alternates

Travis Fisher
Banner County High School

Daniel Augustyn
Lincoln Pius X High School

Heather Price
Hastings Senior High School

Kelly Collins
Omaha North High School

The Energy Department reduced the student honors program by about half this year. Last year, seven Nebraska students visited seven research labs and two students attended the National Youth Science Camp.

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

Square Footage More Than Doubles, But Energy Use Drops by 21%...

State's Army National Guard Wins Energy Award

By cutting its energy use 21.8 percent, Nebraska's Army National Guard took first place this year in the Secretary of the Army's Annual Energy Conservation Program.

"It's a total team effort from the individual units spread across the state to the members of the Nebraska Army National Guard energy team in Lincoln," said Chief Warrant Officer Steven Weber, the state energy coordinator. "This program is helping us save not only our monetary resources, but also our critical energy resources."

In making the award, Army Secretary Togo West said, "the cost savings resulting from reduced energy consumption played a vital role in allowing the Army to reprogram its limited assets in areas of strategic and tactical need."

"Even though we have gone from maintaining around 200,000 square feet of space in 1985 to some 500,000 today, our fixed facilities energy consumption has decreased more than 21 percent," said Weber. "We have put more insulation in our buildings, improved the type of lighting, set back our thermostats and changed people's bad energy using habits."

Local Efforts Critical to Win

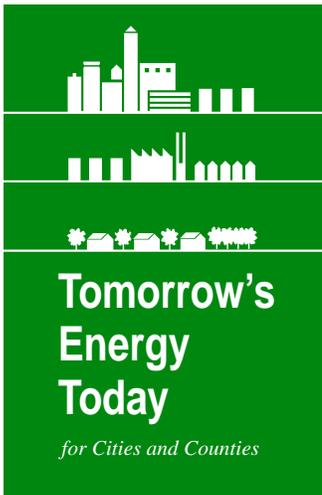
Local service facilities and armories were previously recognized as part of the overall state-wide effort. Service facility awards were garnered by Lincoln's Class Nine Supply and the Organizational Maintenance Shops in Mead and North

Platte. Armories in Crete, York, Broken Bow, McCook, Columbus, Seward, Kearney, Ogallala and O'Neill were also recognized for their efforts.

In 1994, the state's army unit finished second in the nation behind the Louisiana Army National Guard. The state energy action committee which coordinates energy conservation activities was formed in 1985. ■



Left to right: CW04 Steve Weber, Robert Walker, Assistant Secretary of the Army for Installation, Logistics and Environment and Brigadier General Francis A. Laden



More Ideas for City and County Government Officials...

Making the Right Cost, Energy and Environmental Choices

Local government officials in Nebraska can learn how other city officials across the nation are saving energy and tax dollars for their residents.

A series of fact sheets chronicle today's success stories by city and county officials who are putting

energy efficiency and alternate energy solutions into practice every day.

Twelve fact sheets on topics ranging from saving a city's energy costs to alternative waste water systems for small towns were profiled in past issues of the *Quarterly*. Brief summaries of the six latest fact sheets are summarized on this page.

- **Build Up Energy Savings with Residential Standards.**

Investing your time and effort in residential energy efficiency standards will pay generous financial and environmental dividends to your community. "Investments in energy-efficient buildings keep money in the community and yield twice the number of jobs as the same investments in energy supply," said Doug Seiter of Austin, Texas.

This fact sheet profiles both voluntary and mandatory approaches to establishing residential energy standards and highlights shared features.

- **Public Utilities Supply Solar Energy to Eager Customers.** Photovoltaic power is an alternative source of energy that can help utilities earn goodwill from their customers for being innovative, saving money and reducing harmful emissions. In the last 20 years, more than 65 cities in 24 states have installed photovoltaic systems.

"For example, we were installing street lights in downtown alleys to increase safety and reduce crime," said Donald Osborn from Sacramento Municipal Utility District. "It costs \$5,000 to \$6,000 to put in conventional lights, once you consider trenching, conduit and other factors such as overhead. But the photovoltaic lights cost only \$3,000 installed. That's an immediate savings of at least \$2,000. If you're not using photovoltaics for remote and selected distributed-power applications now, you're throwing money away."

The Electric Power Research Institute has identified more than 60 different cost-effective applications including transmission and distribution, environmental monitoring, communications, sensors, warning sirens and bus shelters.

- **Blazing the Energy Trail: The Municipal Energy Management Program.** The Urban Consortium Energy Task Force pioneers energy and environmental solutions for cities and counties. When local officials participate in the task force, they open the door to many resources for their communities. More than 250 projects demonstrating innovative technologies and management tools have been undertaken by the Task Force.

"Communities are sitting on a gold mine of potential savings. One of the primary ways to save is to reduce the municipal government energy bill," said Mike Lindberg of the Task Force.

Annually, the Task Force solicits proposals from cities and counties with populations of more than 100,000. Smaller towns may join together to submit proposals. Available funding ranges from \$25,000 to \$75,000 for each project.

- **Commercial Energy Codes Lay Foundation for Saving Money.** Making commercial buildings more energy efficient calls for more thinking, not necessarily more money. "Energy efficient new buildings cost no more to build than 'energy hog' buildings and energy efficient retrofits cost an average of only two percent more than a standard renovation to complete," said Ron Balon, a Maryland commercial energy code specialist.

Building owners and tenants both profit from lower utility bills and owners reap the additional benefit of the building's increased market value.

- **Sustainability Protects Resources for Future Generations.** Today, many cities and counties are taking steps to make certain tomorrow's urban centers remain livable for generations to come. Collective efforts to accomplish this mission are referred to as sustainable development, or sustainability.

Newark, New Jersey (population 329,000), and Chattanooga, Tennessee (population 216,000), are profiled in this fact sheet. Newark, where recycling is a priority, recycles 52 percent of its solid waste. Since 1990, the city has saved taxpayers \$15.44 million in disposal costs and collected \$167,000 from recycled goods. Seventy recycling firms operate in the city, employing 1,000 people.

Chattanooga's concern involved revitalizing a decaying city. "The children weren't staying. They'd grow up here and then leave," said Susan Kendall Tillman, director of the city's effort. The city is now on a path to turn their dreams into reality.

- **Public Utilities Discover Power Blowing in the Wind.** Wind is a proven, cost-effective and environmentally attractive source of power for public utilities around the country. And with recent technological innovations in wind turbine design, more public utility officials are using this vast renewable energy resource.

Several towns using wind power to augment traditional electric power sources are profiled including Waverly, a town with fewer than 10,000 people in north central Iowa. "City officials set out to determine if small utilities can own, operate and maintain wind systems," said Glenn Cannon, local utility manager.

Installed in 1993, the wind turbine system cost \$126,976 including the land lease and legal fees. A \$25,000 grant from the American Public Power Association offset the project's costs. In the first nine months, the turbine produced 102,857 kilowatthours of electricity, about one percent of the town's needs. Five additional turbines are to be installed later this year.

These guides, produced by the U.S. Department of Energy, are packed with information tailored to towns of all sizes.

Any of these publications can be obtained from **Sally Evans**, National Renewable Energy Laboratory, 1617 Cole Boulevard, Golden, Colorado 80401-3393, Phone 303-275-4363, Fax 303-275-4053. ■

First Time in Nebraska...

Weatherization Professionals Gather in Lincoln

In May, more than 250 weatherization professionals from four Midwestern states gathered in Lincoln for a four-day training conference. This was the first time the conference had been held in Nebraska.



Demonstrations on effective energy saving techniques were held at several sites in Lincoln during the conference.

Conference participants attended more than 50 sessions on how to improve aspects of the Low Income Weatherization Assistance Program at the local level.

The federally-funded program provides free home weatherization to people who cannot afford to make the improvements themselves.

Nebraska Impact

In the most recent reporting period, 2,063 homes — 601 occupied by senior Nebraskans — were weatherized in the state. Funding of \$4.6 million for the program came from three

sources: the federal Low-Income Weatherization Assistance Program, the federal Low-Income Home Energy Assistance Program and state oil overcharge funds. Oil overcharge funds for this effort are expected to be exhausted by mid-1997. ■

What People Across the Nation Have Been Saying About the Weatherization Program

“For nearly 20 years, the Weatherization Program has helped millions of Americans live more comfortably while lowering their energy bills by up to 35 percent. More than four million low-income households in the U.S. have benefited. Funding in 1995-1996 will provide for weatherization of more than 116,000 homes, supporting 17,000 jobs.”

Deputy Secretary Bill White
U.S. Department of Energy
February 26, 1995

“For most low-income households, the reduction of annual home heating costs by 20 percent or more translates to more affordable monthly housing costs and a path for arresting account arrearage growth. Weatherization reduces the pressure on government, utilities and charities to respond to home heating emergencies and utility payment subsidies.”

W. Conn Sharp
Columbia Gas Distribution Co.
Columbus, Ohio

1826 and 1844

In April 1826, Captain Samuel Morey of Orford, New Hampshire, received a patent for an internal-combustion engine. The engine had two cylinders, 180 degree cranks, poppet valves, a carburetor, an electric spark and a water cooling device. The engine was powered by spirits of turpentine vapor.

Less than two decades later in 1844, Stuart Perry of New York City patented a gas engine. It was a non-compression cylinder engine which also used turpentine vapors as fuel.

At that time, pine trees were the source of the turpentine vapors.

The Latest in Alternative Fuels

The U.S. Department of Energy's Argonne National Laboratory has just published six new alternate fuel booklets:

- **Alternative Fuels Glossary of Terms** defines relevant fuel terms.
- **Alternative Fuel Information Sources** lists information resources in the alternative fuels industry.
- **Comparative Alternative/Clean Fuels Provisions of the Clean Air Act Amendments of 1990 and the Energy Policy Act of 1992** offers a side-by-side chart that describes the similarities and differences between the two laws. Compliance specifics, geographic areas affected and other provisions are detailed.
- **Domestic Alternative Fuel Vehicle Outlook** lists vehicles available during the current model year, specifications, emissions standards and costs.
- **Facts about CNG (Compressed Natural Gas) and LPG (Propane) Conversion** details converting vehicles designed to operate on gasoline or diesel to natural gas or propane. Information on emissions, tampering regulations and safety standards is also provided.
- **State Alternative Fuel Laws and Incentives** lists applicable laws and incentives adopted in each state.

To obtain free copies of any of the booklets, contact **Jerry Loos** in the Energy Office or the **Alternative Fuels Hotline** at 800-423-1363. ■

Frequently Asked Questions...

6% Dollar and Energy Saving Loans

The *Nebraska Energy Quarterly* features questions asked about 6% Dollar and Energy Saving Loans. Loan forms may be obtained from participating lenders or the Energy Office.

When calculating the simple payback of an irrigation engine, can the trade-in value of the old engine be deducted from the entire cost of the project?

Yes, the cost of the proposed project should be the net out-of-pocket expense for all equipment, materials and labor necessary for a properly functioning system. Any trade-in allowance or rebate should be subtracted from the cost of the new equipment when calculating simple payback for those projects that require an energy analysis to prove their eligibility.

The simple payback calculation is not needed for pre-qualified projects such as appliance replacements, door, window, wall, ceiling, heating, cooling, water heating and lighting projects. These projects are found on forms 1, 2A, 2C and 2D.

Why do siding projects require so much insulation?

Siding alone is not eligible for financing for a loan because little energy will be saved from the improvement. However, if siding is part of a wall insulation project, a low-interest loan can be used to finance the improvement if the total R-value of the insulation added to the wall is at least R-10.

Loan forms 2A and 34 are used to describe the project.

The loan can include the cost of insulation, siding and any door or window wraps.

If the existing walls are not insulated, the cheapest solution is loose-fill insulation which is blown into the wall cavities. This project will insulate walls to R-13 and requires no exterior siding. However, insulating board of at least 1/2" thickness may be added to the outside wall and then covered with siding.

If the walls have already been insulated, new insulation can only be added to the exterior. A number of rigid board insulation products ranging from one to two inches may be used. While the Energy Office does not recommend specific products, staff can provide advice on insulation designs which can meet the R-10 requirement. As long as the minimum insulation level is achieved, the borrower may select any insulating method.

What details are required to be included in the bids?

In reviewing loan applications, the Energy Office must be able to determine if the improvements being proposed are eligible for financing with a low-interest loan.

Many projects include both types of improvements — those which can and cannot be financed. Borrowers' bid specifications should itemize

each type of improvement. An alternative to one bid is listing the improvements on two bids: one for projects which can be financed and one for those which cannot be financed.

Can existing ducts be replaced or additions made when a heating or cooling system is being replaced?

Yes, duct work can be financed, except in one situation — new construction.

If the minimum standards have been met for the replacement heating or cooling unit, some or all of the duct work being replaced can be included in a loan. Also, if new duct work will be required because

of a change in systems, the additions can be included in the loan. These situations generally arise when electric baseboard heat is being replaced with a gas furnace or a heat pump.

Loans cannot include duct work for new additions to existing structures even if the heating or cooling unit meets or exceeds minimum standards. In this situation, the duct work should be itemized separately on the bid specifications and not included in the loan application. ■

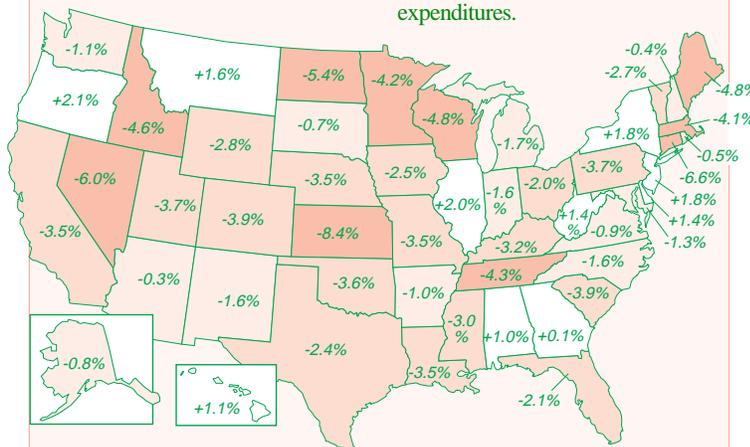


The Energy Tax Gap

Historically, Nebraska's gasoline tax usually ranks as one of the top five or top ten highest in the nation. Yet, taxes on all types of energy in the state are an estimated two to nearly four percent less than taxes for other goods and services, according to the Alliance to Save Energy.

Forty states, including Nebraska, tax energy at rates lower than other goods and services.

Researchers examined taxes on the ten most widely used energy products — the oil, electricity and natural gas used in the residential, industrial and commercial sectors, as well as the gasoline used on highways — that together account for 87 percent of all energy expenditures.



Percentage difference between energy tax and general sales tax rate

- 0 to +2.1%
- 0.1% to -1.9%
- 2.0% to -3.9%
- 4.0% to -8.4%

Source: Alliance to Save Energy

April 4, 1939

The first electric power generated by cosmic rays was used when rays were trapped by a Gieger-Mueller counter at Hayden Planetarium in New York City. The resulting current was carried by wire to the fair grounds in Flushing Meadows and turned on the colored lights at the 1939 World's Fair.

Creating a New Industry...

State Grants To Promote Recyclable Markets

The state's Department of Environmental Quality will continue to emphasize the development and expansion of markets for recycled materials in its Litter Reduction and Recycling Grants awarded next year.

"It is not enough to simply collect and ship off recyclable materials," said Randy Wood, Environmental Quality Director. "We need to develop uses for the materials collected and instill the philosophy of buying recycled products here in Nebraska. In doing this, we complete the recycling loop by creating new products from these valuable recycled resources."

Examples of recycling market projects include conversion of recycled newspaper into animal bedding, plastic lumber from milk jugs, developing regional market cooperatives, modifying manufacturing operations to utilize recycled materials or implementing a "Buy Recycled" educational campaign.

An estimated \$700,000 will be available for grants according to the state agency. Last year, the environmental agency awarded more than \$850,000 in grants of which about a quarter of the funds were targeted for recycling markets. Grant funds come

from a fee on manufacturers, wholesalers and retailers of products which commonly contribute to the litter stream.

Mid-September Deadline

The grant application deadline is September 15, 1995. Selection of grant winners is expected in late 1995 or early 1996. In the past, grants have been awarded to eligible public education, cleanup and recycling programs in the state.

For more information or to receive grant application materials, contact **Pat Langan**, Nebraska Department of Environmental Quality, Litter Reduction and Recycling Grant Program, P.O. Box 98922, Lincoln, NE 68509, Phone 402-471-4210, Fax 402-471-2909. ■

Editor's Note

In the Spring 1995 issue of the *Nebraska Energy Quarterly*, the proposal to sell the federally-owned power marketing administrations was detailed as well as the possible impact on Nebraska's ratepayers. This article updates the status of the proposed sale.

Congressional Action Uncertain...

Selling the Federal Hydropower Marketing Administrations

An issue currently winding its way through Congress has a number of Nebraskans watching. The issue is the proposal to sell all or some of the federal power marketing administrations. Thirty-two states receive electricity from the four largest power marketing agencies.

While most Nebraskans have not heard of these federal agencies, one — Western Area Power Administration — provides an estimated 15 percent of the state's annual electrical needs.

The Senate recently adopted a non-binding "sense of the Senate" resolution as part of its budget bill which blocked the sale of the power marketing administrations. The resolution, adopted by a 64-35 vote, reversed an earlier vote on the Senate Budget Plan adopted in May.

According to the *Wall Street Journal*, "House leaders are being seduced by appeals for a sweetheart sale of power marketing administrations to their existing customers, including rural power co-ops." The *Journal* quotes one Congressman, "The

Elementary Teachers Learn Energy Basics



Diane Russell, (standing) energy educator for the Nebraska Mathematics and Science Initiative, asks for names of Nebraska energy resources as part of a summer workshop for elementary science and math teachers held recently in Lincoln. More than 450 elementary teachers participated in "Bursts of Energy" education workshops throughout the state this summer. Teachers learned about energy using experimental, discovery-based activities. The workshops were a means to integrate energy into math and science education and are part of the partnership between the Energy Office and the Nebraska Mathematics and Science Initiative.

lobbyists are ahead right now. The power marketing administrations will be the most important symbolic fight of the summer."

Both Houses of Congress must deal with this issue as part of the budgeting process which is expected to be completed by

"A powermarketing administration sale in the U.S. could net the Treasury some \$8 billion, and even the Clinton administration supports a partial sale."

Wall Street Journal
July 25, 1995

October 1, the start of the federal budget year. After each side adopts its budget, both spending plans go to a reconciliation committee for compromise. Then, each body must vote on the reconciled budget plan. If adopted, the spending plan goes to the President for approval or veto. ■

Mowing Your Lawn Can Now Be Clean and Quiet

While electric lawn mowers have been available for decades, one drawback — a very, very long electrical cord — kept them from catching on. But, because of technological advances, electric lawn mowers are now cordless and more.

A Pollution Winner

From a pollution and energy conservation standpoint, the new electric mowers are clear-cut winners. Compared to typical gasoline mowers, the new breed of electric mowers use only one-third the energy — including all the energy needed to generate and transmit the electricity — resulting in less pollution. According to the Environmental Protection Agency, one hour of gas-powered lawn mowing produces as many hydrocarbons as driving a car 50 miles.

Four models, including a solar-powered one, are now on the market. Mowers from Black and Decker and Ryobi are traditional, hand-guided ones. The solar-powered mower from Poulan/Weedeater takes technology further — it's a robotic grass cutting system. Ardisam offers a riding mower which *Popular Mechanics* magazine listed as one of the publication's 1995 Products of the Year. The manufacturers indicate batteries should last five to seven years and cost about \$65 to replace.

The Models Detailed

- Black and Decker's cordless convertible mower weighs 60 pounds and has an 18-inch blade. The mower runs up to an hour and a half on a single charge, enough to cut a quarter-acre lawn. The battery recharges to 75 percent capacity within three hours and fully in 20 hours. The mulching mower converts to a non-mulching mode, features a hand-grip starter and a one-touch height adjustment system. The cost is about \$350. For more information, contact Black and Decker at 800-235-2000.
- Ryobi's Mulchinator weighs 75 pounds, has an 18-inch blade and also operates for 90 minutes without recharging. A built-in meter indicates power availability. Mowing height can also be adjusted with a single lever. The cost is about \$350. For more

- information, contact Ryobi at 800-525-2579.
- Ardisam's TurfStar Electra 2000 riding mower can cover two acres on a single charge. Recharging takes about 13 hours and a battery charger is included. Able to mow around a 12-inch circle, the Electra has a near-zero turn capability. The 44-inch rear discharge deck has a one- to three-inch cutting height and three separate deck motors with 15-inch blades. The mower has automotive-type rack and pinion steering and disc brakes. The four-speed transaxle has four forward and reverse speeds with infinitely variable speed control. Every part of the mower is recyclable. The cost is about \$4,000. For more information, contact Ardisam at 715-822-2415.
- Poulan/Weedeater's Robot Lawn Mower is powered exclusively by photovoltaic cells. The mower cuts grass continuously as long as the sun shines. The robotic system includes a perimeter sensing device that prevents the mower from straying past an established boundary. An on-board computer stores boundary defining information, as well as grass density details and growth rate data. Since sunshine is needed to power the robot, mowing a lawn could take from several hours to several days. The cost is about \$2,000.

Two Are Lawn-Tested

Six employees of a regional consumer-owned power wholesaler, Basin Electric, in Bismarck, North Dakota, gave the Ryobi and Black and Decker mowers the ultimate test — trying the two mowers in their own yards.

The results were mixed. Three reviewers found the Ryobi excellent given their lawn type and mowing style — one employee even bought one. One reviewer found the mower unacceptable due to weight and operating difficulty in heavy grass. The remaining two reviewers wanted the mowers to have more power and be self-propelled. The consensus seemed to be if the homeowner had a smaller, level lawn and mowed frequently, either of the two mowers would be acceptable. ■

Editor's Note

The Energy Office is providing this information for use by the *Quarterly's* readers. The agency does not endorse or recommend any specific product.

Free Resources

The Energy Office has just published two free resources — the agency's *1994 Annual Report* and *Nebraska Energy Statistics, 1960-1993*. Either resource can be obtained by contacting **Jerry Loos** in the Energy Office.

The *Annual Report* not only details the activities of the Energy Office for the last fiscal year, but provides an overview of national and state energy issues which occurred during the period.

Nebraska Energy Statistics documents the most current information available about the state's energy consumption and production patterns.

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