Nebraska Energy Quarterly

NEBRASKA
Good Life. Great Resources.
DEPT. OF ENVIRONMENT AND ENERGY

December 2019

Clean Diesel Rebate Applications Accepted Through Jan. 17

The Nebraska Department of Environment and Energy's 2019 Clean Diesel Rebate Program is now accepting applications for two types of rebates—local diesel truck replacements and agricultural irrigation pump diesel engine replacements...**continue...**

NDEE Announces Survey Results

Inherent to the duties of the Nebraska Department of Environment and Energy (NDEE) is the preparation of the Nebraska State Energy Plan (NSEP). ...**continue...**

Winter Forecast Projects Possible Lower Energy Bills

On Oct. 11, the National Association of State Energy Officials (NASEO) and the U.S. Energy Information Agency (EIA) convened their annual call with the National Oceanic and Atmospheric Administration (NOAA) to discuss the winter forecast... **continue...**

Federal Funding Awarded for Carbon Capture Study at Coal-Fired Power Plant

The next step toward the potential for a carbon capture operation at Nebraska Public Power District's Gerald Gentleman Station in Sutherland is moving forward... **continue...**

Energy Statistics

Nebraska's Renewable Energy Status

Renewable resources fuel almost one-fifth of Nebraska's net electricity generation... **continue...**

Agriculture & Energy

Poultry Operation to Install Solar Array

NDEE, along with Dundee Bank of Omaha, has awarded a low-interest rate loan for solar facilities associated with a poultry operation...**Continue...**

In the Classroom

NIBB and Educational Outreach

In 2016, the then-Nebraska Energy Office submitted a state competitive application to the US Department of Energy... **continue...**

Energy Tips

How Does Your Home Handle The Cold?

When the thermometer dips below 20ºF you can find out a lot about how well your home seals out the cold... **continue...**

Clean Diesel Rebate Applications Accepted Through Jan. 17

The Nebraska Department of Environment and Energy's 2019 Clean Diesel Rebate Program is now accepting applications for two types of rebates—local diesel truck replacements and agricultural irrigation pump diesel engine replacements. Applications must be submitted to NDEE by Jan. 17, 2020, to be considered.

NDEE established the Nebraska Clean Diesel Program in 2008 to distribute funding received from the U.S. Environmental Protection Agency for the purpose of reducing diesel emissions and improving air quality in the state.

The number of rebates offered in each category listed below may be subject to change, depending on the number of applications received in each category. Rebates will be offered for the following.

Local Diesel Truck Replacements — Funding will assist with the early replacement of diesel trucks with new, cleaner trucks. Trucks eligible for replacement are heavy-duty diesel refuse trucks and medium- to heavy-duty diesel trucks used in local construction, delivery or maintenance operations. The new trucks may be powered by diesel engines or by Compressed Natural Gas (CNG) engines that comply with stricter nitrogen oxide emission standards. NDEE will reimburse 35% of the cost of a new CNG-fueled truck up to a maximum of $120,000, or 25% of the cost of a new diesel truck up to a maximum of $70,000. NDEE anticipates funding replacement of five refuse trucks and seven local construction, delivery and maintenance trucks. Individual applicants may apply for a rebate for up to two trucks.

Agricultural Irrigation Pump Diesel Engine Replacement — Funding will assist farmers with the replacement of irrigation pump diesel engines with electric equipment. Diesel engines may be replaced with an electric motor to power a surface pump or by connecting an existing submersible pump directly to the electric grid. NDEE will reimburse 60% of the cost of the electrical equipment, installation and required electric line extension up to a maximum of $20,000. NDEE anticipates funding 17 irrigation engine rebates.

Photo by Roman Fox on Unsplash

NDEE's 2019 Clean Diesel Rebate Program is accepting applications through Jan. 17. These rebates focus on diesel truck and agricultural irrigation diesel engine replacements.

More information about the Nebraska Clean Diesel Rebate Program, including rebate applications, can be found at NDEE's Clean Diesel Program webpage: http://deq.ne.gov/NDEQProg.nsf/OnWeb/NCDGP.

The Nebraska Clean Diesel Rebate Program is separate and distinct from the Nebraska Diesel Emission Mitigation Program funded by the Volkswagen Diesel Emissions Environmental Mitigation Trust for State Beneficiaries. NDEE has been designated to administer funds through this separate VW program, which is based on a federal court settlement. NDEE has developed a mitigation plan to guide the use of these funds. For more information about Nebraska's program under the VW settlement, go to: http://deq.ne.gov/NDEQProg.nsf/OnWeb/AirVW.

Photo by Dale Link

Back to page 1

NDEE Announces Survey Results

In preparation for the drafting of the Nebraska State Energy Plan, NDEE prepared a 10-question general energy survey in September 2019 to assess energy issues important to Nebraskans.

The last energy plan, issued in 2011, was titled "2011 Nebraska Energy Plan" and is available online.

NDEE promoted the survey on its website, in a press release to more than 150 local news outlets , through social media and through a number of agency listservs. NDEE's listsevs included architects and engineers, those on the Energy Quarterly Newsletter and those on a listserv maintained by the Air Quality Division. Altogether, these listservs included approximately 10,000 individuals, with a calculated response rate of about 9.7%, or 968 respondents. A majority (77%) reported residential as the sector most representative of their energy use.

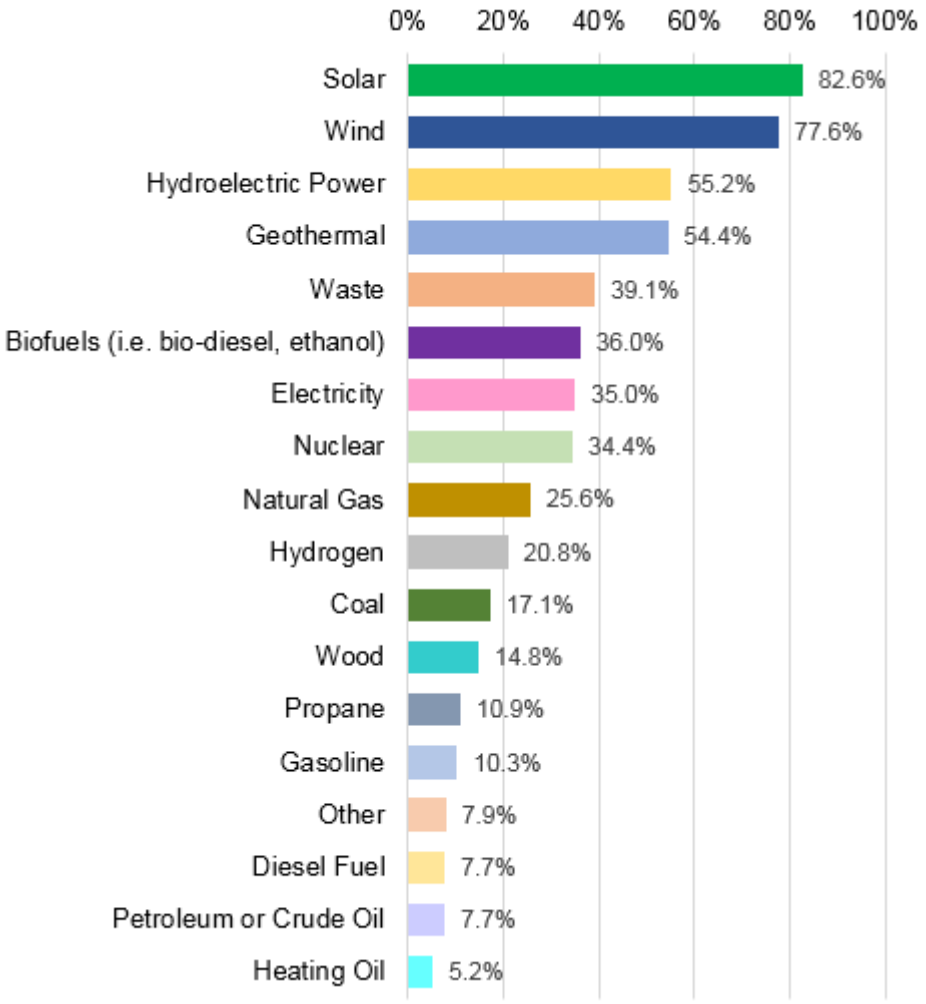

Figure 1

Respondents expressed their understanding of the need for a diverse, sustainable energy portfolio with a preference toward reliability and renewable energy resources with minimal environmental impacts.

Comments received indicate respondents want to be engaged and involved in the NSEP process, especially toward consideration of the regional differences that occur across the state with regard to urban and rural landscapes, energy distribution challenges and more. The top three preferred renewable strategies noted by participants include, in order: solar, wind and hydro-electric power generation.

As shown in figure 1, the top three preferred energy types strategies noted by survey participants include solar, wind and hydroelectric generation.

Respondents were asked what energy sustainability meant to them and where research should be focused to provide sustainable energy, their responses summarized:

1) Using energy from renewable resources – 30%;

2) Creating energy without harm to the environment – 23%;

3) Meeting all of Nebraska's energy demand with in-state renewable resources – 13%;

4) Other – 12%; and

5) Conserving energy for future generations-9%.

For the "other" category, many commenters cited "all of the above." Many included their own definition that had additional criteria such as cost, affordability, reliability and good environmental stewardship. Additionally, responses ranked the following areas as highest research priorities:

• Using alternative energy;

Back to page 1

• Creating energy storage and
• Improving existing energy processes.

In two open-ended questions at the end of the survey, respondents submitted more than 1,100 comments on what the state should consider during development of Phase II of the NSEP.

Question 9 (Figure 2) asked "what is your biggest roadblock in implementing sustainable energy practices?" Forty-six percent (46%) noted cost, affordability or incentives. The next highest response category (24%) was infrastructure, accessibility, or availability, followed by Government (14%) and Education (12%).

Question 10 asked respondents to "provide any additional comments on important energy issues for Nebraskans to consider in revisions of the NSEP." It was clear that respondents want to establish clear priorities made with measurable objectives supported by facts and actual life-cycle costs. Themes such as energy conservation, education and implementation incentives through policy or standards revisions were noted in a significant number of comments received.

While these survey results are included in Phase I of the NSEP, they are designed to help guide the priorities of Phase II.

In an effort to continue to garner public thoughts on all things related to the NSEP, the reader is encouraged to submit comments to neo.energy@nebraska.gov.

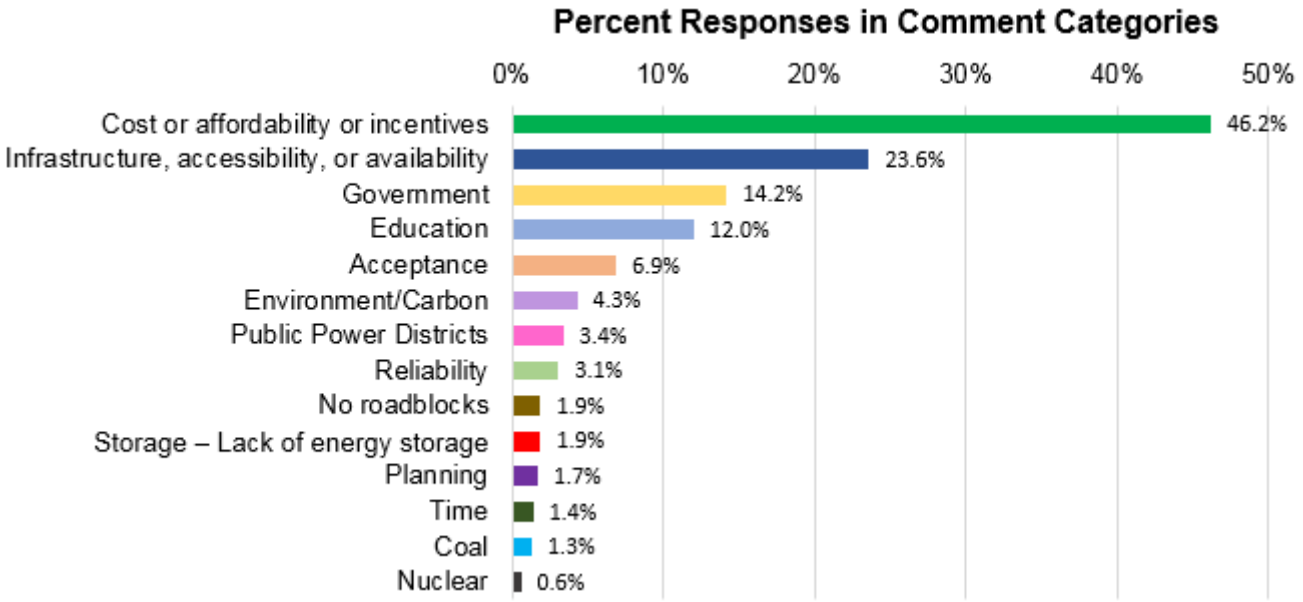

Figure 2

Winter Forecast Projects Possible Lower Energy Bills

On Oct. 11, the National Association of State Energy Officials (NASEO) and the U.S. Energy Information Administration (EIA) convened their annual call with the National Oceanic and Atmospheric Administration (NOAA) to discuss the winter forecast.

The forecast indicates a less severe winter than what was experienced in 2018-19. NOAA's forecast information coupled with EIA's fuel price and consumption forecast was the basis for EIA's Winter Fuels Outlook. Households relying on electricity or natural gas to heat their homes may anticipate spending slightly less. Households using heating oil will see a 4% reduction in heating costs, while households using propane gas may spend even less – up to 16%.

Photo by Joakim Honkasalo on Unsplash

The winter forecast may be less severe than originally anticipated, which could mean energy savings when it comes to heating homes.

Back to page 1

Federal Funding Awarded for Carbon Capture Study at Coal-Fired Power Plant

Reprinted with permission from the Nebraska Public Power District

The next step toward the potential for a carbon capture operation at Nebraska Public Power District's Gerald Gentleman Station (GGS) iis moving forward with the announcement of the U.S. Department of Energy (DOE) National Energy Technology Laboratory's funding for the study.

DOE selected nine projects to receive $55.4 million in federal funding for cost shared research and development. The award for Phase II for the GGS study is approximately $5.8 million.

Under this new funding, lON Clean Energy Inc. will be the award recipient on the project, which will complete a Front End Engineering Design study (FEED) for the installation of its advanced carbon capture system retrofitted to NPPD's Gentleman Station near Sutherland.

The FEED study will build on the results of Phase I, increasing the capture size from 300 megawatts CO_2 capture island up to 600 megawatts. lON will utilize its leading solvent–based CO_2 capture technology, ICE -21, as the basis for the CO_2 capture design.

Photo provided by NPPD

Nebraska Public Power District's Gerald Gentleman Station in Sutherland was selected to receive federal funding for a research and development project.

"NPPD continues to be interested in the project moving forward because our coal burning generation resources bring significant value to our customers," said Vice President and Chief Operating Officer Tom Kent. "We are seeking these types of technologies that can capture CO_2 in a cost-effective manner."

Alfred "Buz" Brown, ION's CEO, also issued a statement on the partnership.

"We are pleased to continue our partnership with NPPD to further evaluate the integration of ION's transformative CO_2 capture technology at an existing coal-fired power station," Brown said. "These types of strategic collaborations are key milestones on the path to commercialization of ION's large scale decarbonization technology."

The project team for the Phase II study includes lON, NPPD, Sargent & Lundy, Koch Modular Process Systems and Siemens. The project will provide critical data and insight into the integration of CO_2 capture technologies onto existing coal-fired power plants.

Back to page 1

Nebraska's Renewable Energy Status

From the U.S. Energy Information Administration

Renewable resources fuel almost one-fifth of Nebraska's net electricity generation, and the state has substantial undeveloped renewable resource potential.

Wind energy potential is excellent across the entire state, and wind powers the largest share of Nebraska's renewable electricity generation. In 2018, wind energy's contribution to the state's total net generation was almost twice as much as it was five years earlier, and wind accounted for three-fourths of the state's generation from renewable resources. Nebraska has nearly 1,000 wind turbines with more than 1,650 megawatts of generating capacity installed at utility-scale (greater than one megawatt) facilities.

Hydroelectric facilities produce most of the rest of Nebraska's renewable electricity generation. Nebraska obtains less than 5% of its total net electricity generation from hydroelectric power, with annual generation much lower in years with drought.

In 2017, there were 11 hydropower generating plants in Nebraska. There is little potential for the development of additional conventional hydroelectric facilities in the state, but the use of small-scale generators in natural water flows may be feasible.

Nebraska's solar resources are greatest in the western part of the state, but development is limited. The largest solar photovoltaic (PV) project in Nebraska, a 5.7-megawatt facility, became operational in December 2017. Nebraska has about 16 megawatts of utility-scale solar PV capacity and almost 8 megawatts of distributed (customer-sited, small-scale) capacity.

However, it appears utility level solar power is poised to increase substantially. Omaha Public Power District has announced it will be adding between 400 and 600 Megawatts (MW) of solar power in the near future and there is a company looking to establish a 230 MW solar farm in Lancaster County. There are also a number of smaller projects in the planning process.

Photo by Karsten Würth on Unsplash

Nebraska has wind, hydroelectric, solar, geothermal, ethanol and other biofuels available as renewable energy.

Although moderate geothermal energy potential exists across much of the state, there are only a few small areas in northwestern Nebraska with the high-temperature resources needed for power generation, and Nebraska does not generate electricity from geothermal energy. However, some geothermal heat pumps used for heating and cooling buildings have been installed in the state.

Nebraska is the nation's second-largest producer of fuel ethanol. Nebraska is second only to Iowa in the production of corn-based fuel ethanol. There are 25 active ethanol production facilities in the state. Nebraska ethanol producers use more than 700 million bushels of grain to manufacture more than two billion gallons of ethanol each year. The state's ethanol plants produce almost 24 times as much ethanol as is consumed in Nebraska, and most of the ethanol produced in Nebraska is shipped to other states.

Nebraska uses landfill gas and other waste biomass resources to generate electricity, but biomass-fueled power plants contribute less than one-half of one percent to the state's net electricity generation.

Back to page 1

Nebraska does not have a renewable energy standard. The state does have interconnection and net metering rules for distributed solar PV, landfill gas, wind, biomass, geothermal electric, anaerobic digestion and small hydroelectric power generation.

Customer generators must pay for the costs of interconnection, and the utility must provide the metering system at no cost to the customer. Utilities must provide net metering and interconnections for up to 25 kilowatts of power from each generator, and must accept distributed generation up to an aggregate total of 1% of the utility's average monthly peak electricity demand for the year. To encourage renewable generation, a number of financial incentives, rebates, loans, tax incentives and technical resources are available. Nebraska also has a statewide building energy code.

Agriculture and Energy

Poultry Operation to Install Solar Array

The Nebraska Department of Environment and Energy, along with Dundee Bank of Omaha, has awarded a $499,500 low-interest rate loan for solar facilities associated with a large poultry operation in Seward County.

Great Plains Renewables of Omaha is installing a 146 kilowatt solar array project in Staplehurst for Big Knott Farms, LLC, which is leasing the installation from Dundee Bank. Big Knott Farms is a husband-and-wife operation that holds a 15-year contract for a poultry farm. Norris Public Power District is the electric supplier in the Staplehurst area.

Photo by Zbynek Burival on Unsplash

Through the Dollar and Energy Saving Loans program from NDEE, one poultry operation is installing a solar array.

This loan is through NDEE's Dollar and Energy Saving Loans Program, which was created from the federal oil overcharge settlement in the late 1980s. This revolving loan program is available to Nebraska residents and businesses for a variety of energy conservation projects. The Big Knott Farms project qualified because it is a solar project.

Other energy saving agricultural projects like low-pressure pivots, grain dryers, no-till equipment and dairy vacuum pumps, among others, may also qualify for the DESL program.

Back to page 1

Nebraska Initiative Benchmarking and Beyond

In 2016, the then-Nebraska Energy Office submitted a state competitive application, Nebraska Initiative Benchmarking and Beyond (NIBB), to the U.S. Department of Energy to launch a major initiative in energy efficiency benchmarking by the state of Nebraska. NIBB has four major projects within this program and one of them was educational outreach.

This project had two components, the first to create an awareness about benchmarking to high school science, technology, engineering and math (STEM) teachers. NEO established a collaboration with the University of Nebraska of Omaha to provide training in ENERGY STAR® Portfolio Manager (ESPM) benchmarking to interested educators, university student interns who would be working on other parts of NIBB, and to interested state employees who were involved with facility management.

The initiative included training sessions throughout the state. One session was part of the Nebraska Academy of Science and Math's meeting, where 400 educators learned about NIBB and using ESPM as an instructional tool in the classroom. After several presentations and meetings with the Green Schools partnership, it was determined that a benchmarking curriculum in compliance with the state's science educational standards had to be created.

Photo by Sam Balye on Unsplash

The Nebraska Initiative Benchmarking and Beyond launched an energy benchmarking awareness campaign among high school science, technology, engineering and math teachers.

Work was completed on both a high school and middle school curriculum in January 2019. Currently, the curriculum has been adapted in a course in geo-science being taught at Lincoln Public Schools.

The second educational outreach component was in the area of workforce development for state employees who are involved in facility management. Two courses that included building energy efficiency benchmarking were presented in Building Operator Certification and Certified Energy Management to 28 state facility managers who completed the training in the fall of 2018 and the spring of this year.

Back to page 1

How well does your home seal out the cold?

Reprinted with permission from the Nebraska Public Power District

When the thermometer dips below 20ºF and there is more than a little breeze outside, you can find out a lot about how well your home seals out the cold.

You might notice your curtains lightly swaying with each pulse of wind. You might go downstairs into your basement and wonder why it feels 10 degrees colder than the main floor. Perhaps you wonder why the snow has already melted off your roof while your neighbor's is still totally white. Worse yet, you might have opened your latest utility bill to find you used two or three times more energy than the prior month.

All of these situations are often the result of one common problem: infiltration.

Infiltration is the unintentional or accidental introduction of outside air into a home, typically through cracks in the building envelope and through use of entryways. Some people refer to infiltration as air leakage. Infiltration can be caused by wind, negative pressurization of the home and air buoyancy forces commonly known as the "stack effect."

The stack effect happens when warm air moves upward in a building. This happens in summer and winter, but is most pronounced in winter when indoor-outdoor temperature differences are greatest. Warm air rises because it is lighter than cold air. So when indoor air is warmer than outdoor air, it escapes from upper levels of a home and through open windows, ventilation openings or penetrations and cracks in the building envelope.

Rising warm air reduces pressure in the base of the home, forcing cold air to infiltrate through open doors, windows or where the house sets on its foundation. In winter, this can result in warm, moist indoor air moving into cold envelope cavities. As that air cools, it condenses, creating unexpected water problems in unforeseen locations.

File photo

The blower door is one of many tools that is used to assess a home for health, safety and energy efficiency. With the assistance of a blower door, air leakage tests are conducted to measure and quantify the air tightness of a house. The blower door depressurizes the house, sending air out through a fan and bringing air in from leaks in the building's exterior.

In most homes, about one-third of the energy used for space conditioning is due to infiltration. As such, reducing infiltration can yield significant energy savings, with rapid payback.

To gain an accurate estimation of how much infiltration your home is subject to, a blower door test can be conducted. What is a blower door? It is a powerful fan that attaches to an external doorway (typically the entrance to the home) and blows air into or out of the house to pressurize or depressurize the home. The house is depressurized to a pressure of 50 pascals less than outside, which is the equivalent of a steady 20 mile-per-hour wind blowing at all sides of the building. Once this pressure is achieved, the device measures airflow needed to produce this pressure, which of course is the same as the airflow leaking into the house through various cracks. The resulting val-

Back to page 1

ue is measured in Air Changes per Hour, or ACH. This indicates how many times per hour the total volume of air inside a home is replaced by outside air due to infiltration.

Effective July 1, 2020, the State of Nebraska will require new homes be built to meet the 2018 International Energy Conservation Code, which states air changes must be less than 7 ACH at 50 pascals. As Nebraska adopts newer versions of the code, that number will drop below 5 ACH.

If you live in an existing home, there are numerous things you can do to reduce infiltration. Here are a few:

- Caulk and weather-strip doors and windows that leak air.
- Caulk and seal air leaks where plumbing, ducting, or electrical wiring comes through walls, floors, ceilings and soffits over cabinets.
- Install foam gaskets behind outlet and switch plates on walls. Inspect dirty spots in your insulation for air leaks and mold. Seal leaks with low-expansion spray foam made for this purpose, and install house flashing if needed.
- Look for dirty spots on your ceiling paint and carpet, which may indicate air leaks at interior wall/ceiling joints and wall/floor joists, and caulk them.
- Cover single-pane windows with storm windows or replace them with more efficient double-pane, low-emissivity windows.
- Use foam sealant on larger gaps around windows, baseboards, and other places where air may leak out. The sill plate or perimeter where a house sets on a foundation is often a major source of infiltration in existing homes.
- Ensure kitchen and clothes dryer exhaust ports on the outside of your home have flaps that seal when not in use.
- Replace door bottoms and thresholds with ones that have pliable sealing gaskets.
- Keep the fireplace flue damper tightly closed when not in use.
- Seal air leaks around fireplace chimneys, furnaces, and gas-fired water heater vents with fire-resistant materials such as sheet metal, sheetrock and furnace cement caulk.

For additional ideas on how you can reduce the effects of infiltration and save energy while heating and cooling your home, contact your local electric utility. You may even find you are eligible for incentives for helping with the cost of other energy-saving home improvements, such as NDEE's Dollar and Energy Saving Loans Program or its Weatherization Program.

The Nebraska Energy Quarterly is funded, in part, by the U.S. Department of Energy through the State Energy Program.

Back to page 1