Nebraska Energy Quarterly

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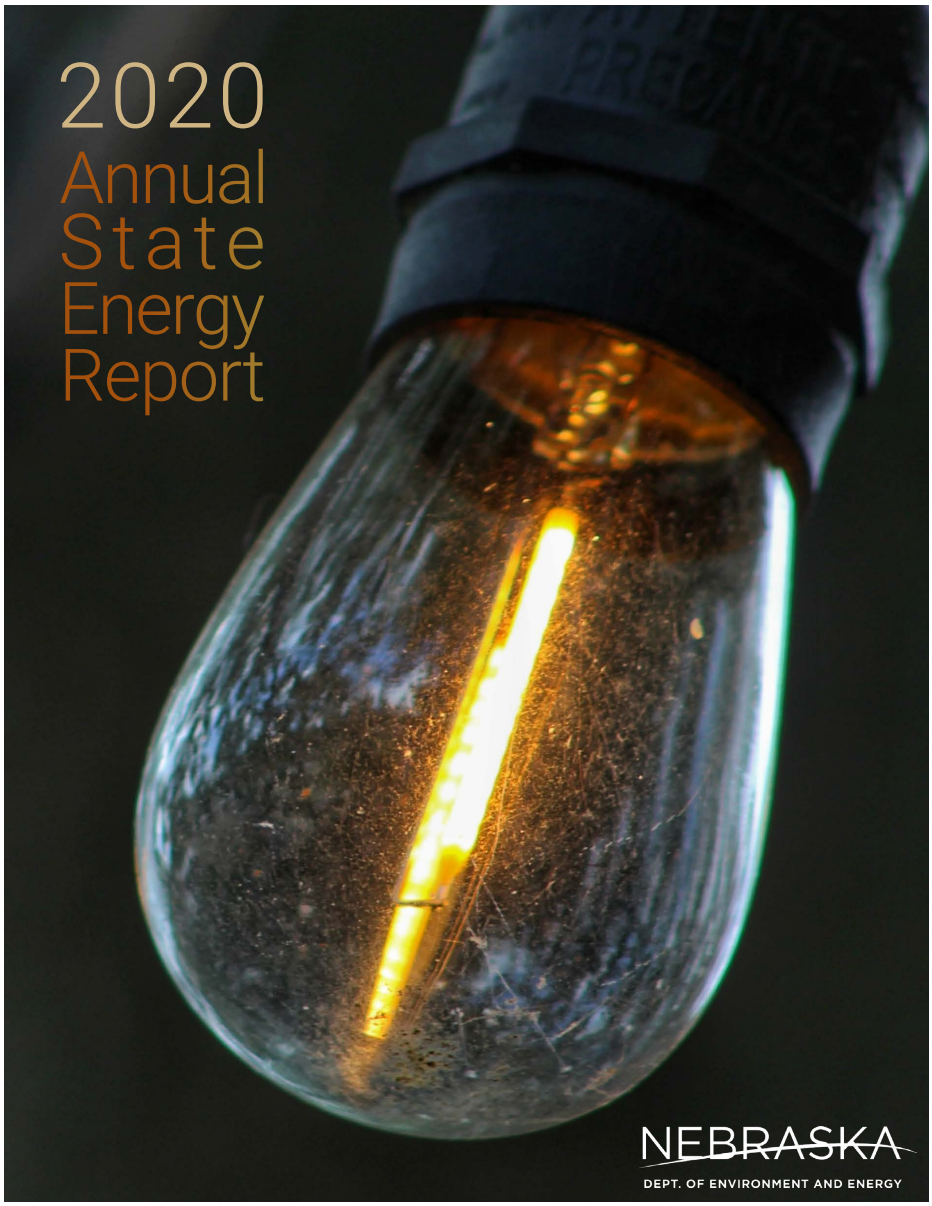
NDEE releases 2020 Annual Energy Report

The Nebraska Department of Environment and Energy has released its 2020 Annual Energy Report to the legislature. It can be found in its entirety on the agency's website.

This report fulfills obligations set by Neb. Rev. Stat. §81-1607, which requires NDEE to submit an annual report that identifies emerging trends in energy supply, demand and conservation within the agricultural, commercial, residential, industrial and transportation sectors, along with other sector information that may be useful.

Information on NDEE's energy programs is also included in this report. There are summaries of FY2020 activities for NDEE's Weatherization Assistance Program, Dollar and Energy Saving Loans Program, State Heating Oil and Propane Program and other special projects.

Questions or comments on this report may be submitted to neo.energy@nebraska.gov.



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Weatherization Assistance Program improves homes, saves on energy bills

The Nebraska Department of Environment and Energy's Weatherization Assistance Program helps Nebraskans with low incomes weatherize their homes at no cost. When homes have more insulation, sealed leaks, and more efficient heating and cooling systems, homes become more comfortable and people can save money on their utility bills.

This program began in 1977, and as of June 2020, it has made weatherization improvements to 70,072 homes, totaling $218 million invested.

Katie Svoboda, a fiscal compliance analyst in NDEE's Weatherization program, said energy costs can place a significant burden on those with low incomes, especially the elderly, those with disabilities and families with children.

"The money these families spend on utilities cannot be used for other household essentials like food, housing or education," Svoboda said. "We want to make homes more energy efficient and comfortable, but also make the home safe."

NDEE receives funding for this program from the Low-Income Home Energy Assistance Program (LIHEAP) and the U.S. Department of Energy's Weatherization Assistance Program. Roughly $2.6 million comes from LIHEAP and $3 million from the DOE. The LIHEAP funds include $500,000 to use for Heating and Cooling Repair and Replacement Assistance Program (HCRRA). With the combined funding of these sources, a total of 453 homes were

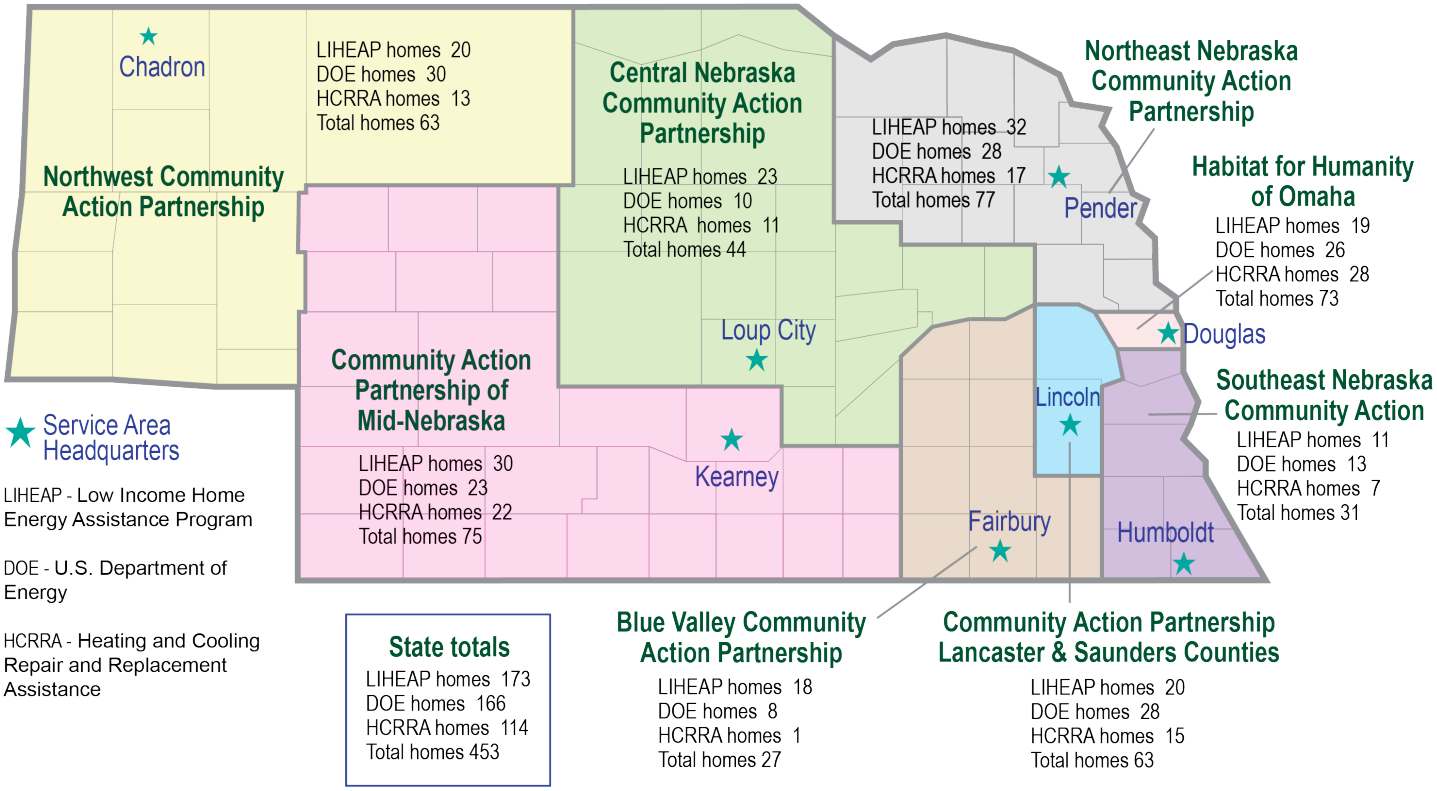

Image from NDEE

This map shows the number of Nebraska homes that were weatherized by area providers between July 2019 and June 2020.

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weatherized in Nebraska in fiscal year 2020.

Those funds are allocated to the seven Community Action Partnership agencies across the state, as well as one non-profit agency in Omaha. These organizations work with individuals and families in their areas to make weatherization improvements. Some of the most common improvements include:

- Adding insulation
- Replacing and repairing furnaces
- Reducing air leakage
- Installing high efficiency lighting
- Insulating water heater tanks and pipes
- Repairing cracked windows

Mobile homes are also eligible for weatherization services, including underbelly insulation, window sealing and sealing air leaks. Renters are eligible, as well, but require written permission from their landlords and some restrictions apply.

Lynn Chamberlin, NDEE's building program specialist, said the groups and individuals involved in the weatherization process have come together to best serve clients.

"The network that delivers the Nebraska Weatherization Assistance Program is a group of people who are deeply committed to the clients, dedicated to the work that the program provides and has developed into a team of professionals that enjoy working together," Chamberlin said. "Watching that team grow and develop has been incredibly rewarding."

Because this program aims to assist those with low incomes, there is an income limit; household income must fall below 200% of the federal poverty level. For example, the poverty guideline for a household of four is $26,200. That household would qualify for the Weatherization Assistance Program if its income were less than $52,400 – double the poverty guideline. Households with people who receive Aid to Dependent Children or Supplemental Security Income are automatically eligible for the weatherization program.

Work crews make the weatherization improvements and NDEE inspects a minimum of 10-15% of all completed homes to ensure a high quality of work was performed. Overall, the average value of weatherization services is $7,500. These improvements can reduce energy used for home heating by 25%, and it can provide energy savings for 10-15 years.

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Energy transition
Change afoot in the auto industry

by Andrew Hug
Environmental Assistance Coordinator

Photo by Emily Case, NDEE

Auto makers and related industries are starting to switch their focus to electric vehicles. In addition to more EV models that are coming to the market, battery and technology improvements mean drivers will see more electric options on the streets.

The largest changes within the auto industry in over a century are starting to become more visible to the public, with a steady stream of announcements for new electric vehicle (EV) model rollouts pegged for 2021 and 2022.

A relatively small number of EVs have appeared on dealer lots over the past several years, but that number is about to expand rapidly as automakers compete to place a wide variety of EV models on the starting line within the next year.

The auto industry and international investors have demonstrated their belief that EVs will soon come to dominate the light vehicle market. But whether Nebraska and U.S. consumers accept EVs depends not only on traditional factors such as comfort, styling and size, but also new factors such as access to chargers and total cost of ownership.

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There has been a recent proliferation of announcements in EV production and gas bans. Ford announced it will sell only EVs in Europe by 2030 and GM announced it will offer only electric vehicles worldwide by 2035. Volvo stated it will go pure electric by 2030. UK Prime Minister Boris Johnson announced a ban on the sale of new gas and diesel passenger cars starting in 2035. California Governor Gavin Newsom announced a similar ban for 2035. The Washington state legislature is considering such a ban for 2030. China, well established as the world's largest car market, will allow only electric and hybrid vehicles starting in 2035.

EV production has also drawn serious attention from major investors worldwide. Tesla, a firm only 17 years old that specializes in EVs, has a market capitalization of $690 billion, giving it a market cap greater than Ford, General Motors, Volkswagen, Toyota, Honda, Nissan and Hyundai combined ($565 billion), as of this writing.

Tesla is one of over a dozen new, well-financed automakers in the U.S taking advantage of a lower barrier to entry; the manufacturing infrastructure to build EVs, while considerable, is still much less than that needed to build internal combustion engine (ICE) vehicles. In fact, there are more auto companies competing in the U.S. now than there have been since before the 1920s. While many of these companies won't survive, they have the backing of major investors such as Blackrock, VanGuard and Saudi Arabia's sovereign wealth fund.

Models and features available

Most of the existing and new EV models appear virtually identical to existing vehicles, such as the Chevy Bolt and the Ford F150, though some have gone the concept car and futuristic routes such as the Tesla Cybertruck.

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The auto industry has offered EV delivery vans, luxury cars, SUVs, sedans and compacts in the U.S. market for a few years, and has announced rollouts over the next two years of every vehicle type from semis to subcompacts and even an electric dune buggy.

Automakers state that the features and options will be largely the same between EV and ICE vehicles–most EVs will offer full set of features and options, such as heated seats, backup cameras and upholstery upgrades, and they will also offer less expensive models.

EVs also have some features not typically available on ICE vehicles, like providing both a trunk and a front trunk, or "frunk." The frunk is made possible because there is so much free space under the hood and, since electric motors generate maximum torque at zero mph, EVs typically offer acceleration that rivals sports cars.

EV pickups are expected to offer towing capacity equal to ICE pickups. Motor Trend reports Ford's electric F150 will offer at least a 12,000-pound tow rating, which matches or exceeds F150s on the market today. The truck will also be designed to serve as a power source at construction sites or on the ranch.

In addition, EVs offer much better fuel economy, so adding more robust physical safety features is now possible.

Charging times and access

In April 2020, existing EV models had ranges from 84 to 391 miles, according to the Environmental Protection Agency. The new EVs have ranges from 250 to 350 miles, with some now offering over 400 miles. As battery technology continues to improve, ranges continue to climb with each new industry announcement.

Transitions to EVs

Industries and financial interests are also changing practices when it comes to the transition to electric vehicles. Here are seven examples:

1) Total, a major European oil company, signed a $6 billion contract with automaker group PSA to build two lithium ion battery gigafactories for the electric car market.

2) Research led by the Harvard T.H. Chan School of Public Health doubled the estimates of premature deaths caused by fossil fuel PM2.5 pollution. The study estimates the pollutant led to 8 million premature deaths in 2018.

3) The Saudi Arabian sovereign wealth fund has invested $1 billion in California-based EV maker Lucid Motors in 2018 and plans to invest more.

4) New EV batteries are expected to last a million miles, according to the industry. Instead of replacing a battery in a car, maybe the car will be replaced around the battery!

5) Australia's CEP Energy plans to install the largest utility-scale battery at 1.2 GW. French battery company Neoen has plans for an even larger 1.8 GW battery.

6) ExxonMobil was removed from the Down Jones Industrial Average in 2020. Meanwhile, EV maker Tesla was added to the S&P 500.

7) BP and Chevron announced a $40 million investment in a geothermal energy startup, which will produce electricity.

Charging times vary depending on battery capacity, the vehicle's charger capacity, the battery's state of charge and the voltage of the power supply. Under most circumstances, if an EV owner can plug the car in at home each night and drives the average amount of 50 miles per day, the car will be at 100% each morning, even if plugged into a regular 120 volt outlet.

If a homeowner installs a 240 volt level 2 charger, he or she can add 15 to 25 miles for each hour, or between 150 and 250 miles on a 10 hour evening/overnight charge. Since a level 2 charger can usually add all the charge needed in just a few hours, some models allow you to schedule the charging session for overnight hours with the lowest electricity rates.

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In addition, tens of thousands of public electric car chargers have already been installed in the U.S. and tens of thousands more per year are scheduled to be installed in the next few years along highways and at employers, apartment complexes and retailers. Websites and cell phone apps provide maps to thousands of public chargers.

As of 2019, there were approximately 80 public charging stations in Nebraska. NDEE recently awarded rebates totaling $1.8 million to install additional chargers in 2020-2021 using funds from the Volkswagen settlement. This rebate program will result in 35 new public charging stations in 18 Nebraska counties, including 21 new sites with public fast chargers.

Sales outlooks

Edmunds forecasts that sales of EVs will climb 32% from 1.9% in 2020 to 2.5% in 2021. Price parity is forecast to happen in 2023 or 2024, according to Bloomberg, which should increase their market share.

Some studies show that total cost of ownership (purchase price, maintenance, repairs, fuel, insurance) is already less than equivalent ICE vehicles, while other studies show that an EV is still somewhat more expensive.

Since fuel, maintenance, repairs and sometimes insurance are already significantly less expensive with an EV than an ICE vehicle, the key is purchase price. As purchase price begins to achieve parity, the total cost of EV ownership will out-compete ICE vehicles.

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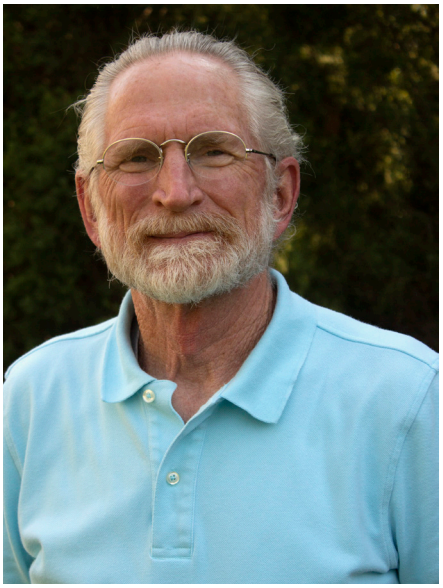
Saying farewell and hello: NDEE announces retirements, new teammates

The Nebraska Department of Environment and Energy has made several transitions through the end of 2020 and into 2021: a new building, a reorganization and some staff changes. While we want to thank all NDEE retirees and welcome all new hires, the information below will focus on teammates in our energy programs. In 2020, two energy teammates retired, and three new team members have joined us.

Retirements

Joe Francis

Joe was the Energy and Assistance Division Administrator when the former Nebraska Energy Office and the Nebraska Department of Environment and Energy merged in 2019. He worked for the state of Nebraska for 45 years and retired on Oct. 15, 2020.



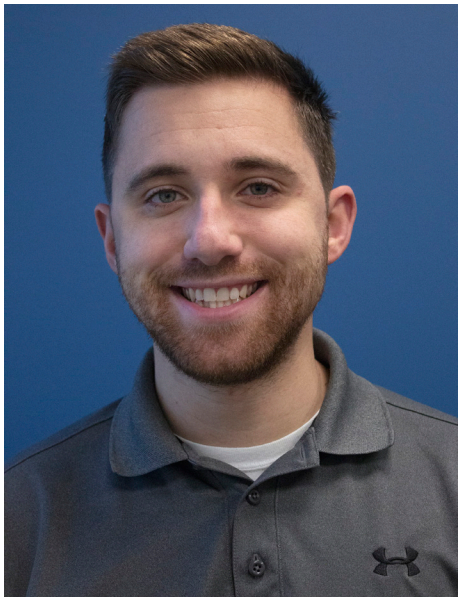
Bruce Hauschild

Bruce was an energy technology advisor for the Dollar and Energy Saving Loan program. He worked for the state for 20 years and retired on Dec. 31, 2020.

New team members

Shawna Orth

Shawna is an energy conservation loan program coordinator with the Dollar and Energy Saving Loans program.



Bryce Puck

Bryce is an energy conservation specialist and focuses on the Weatherization and State Energy Program.

Craig Schieffer

Craig is a conservation program specialist for the Weatherization and State Energy Program.

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Nebraska by numbers

One of NDEE's duties is to maintain a collection of energy data to assess trends in the availability, consumption, and development of all forms of energy. This information can be found on NDEE's statistics page.

The link above contains an abundance of data and information. However, this edition's Nebraska by numbers will mostly focus on energy consumption.

Nebraska ranks...

31st In total energy consumption

Nebraskans consumed 914 trillion British thermal units (Btu) of energy in 2018. In comparison, Vermont had the lowest consumption at 139.2 trillion Btu, and Texas had the highest at 14,258.8 trillion Btu.

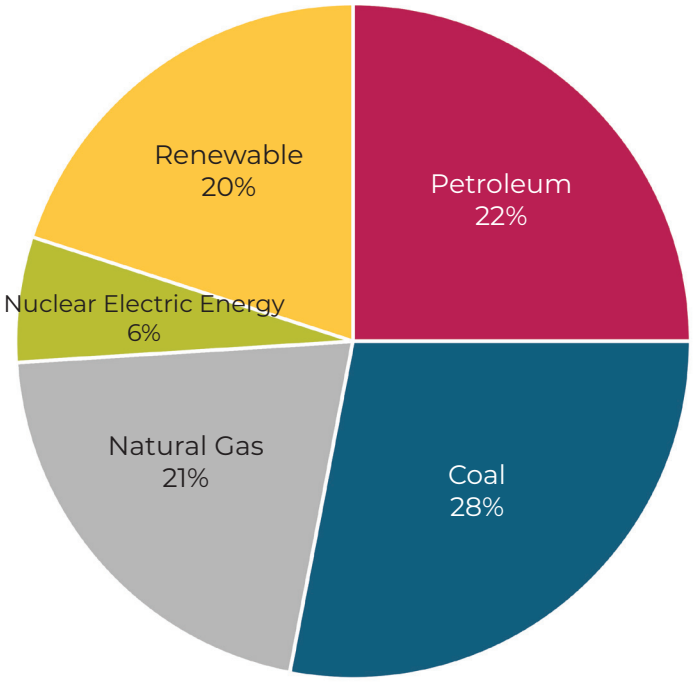
7th In total energy consumption *per capita*

Nebraska consumed 475 million Btu per capita in 2018. Rhode Island ranked 50th in this category at 187 million Btu per capita, and Wyoming ranked first at 967 million Btu per capita. The Energy Information Administration states that Nebraska's per capita energy consumption ranks so high because agriculture and food processing in the state are energy intensive, and because of heating and cooling during Nebraska's hot summers and cold winters.

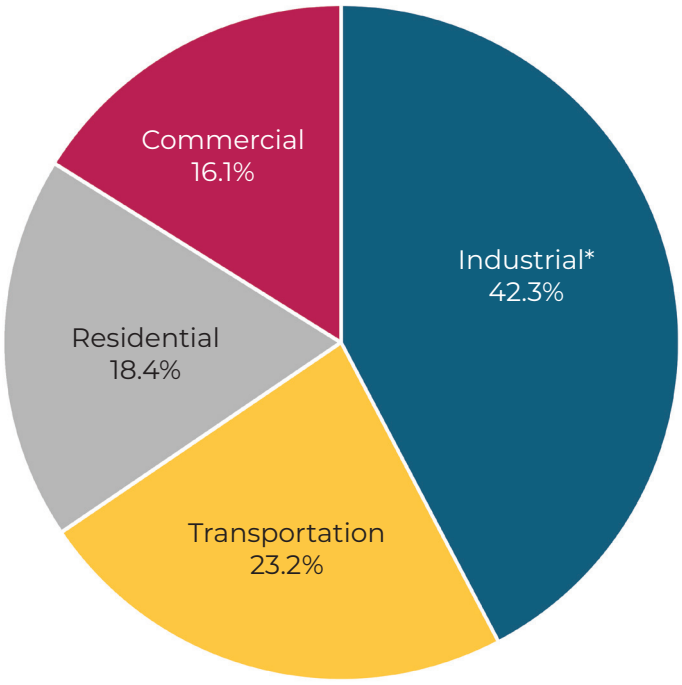
34th In average electricity price

Nebraska's annual average electricity price is $9.02/Kilowatthour—the 16th lowest in the nation. Louisana has the lowest price at $7.71/KWh, and Hawaii has the highest at $29.18/KWh.

Nebraska's total energy consumption by fuel type, 2018



Energy consumed in Nebraska by sector, 2018



*The Industrial Sector also includes agricultural energy use.

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Conservation practices that save: Irrigation Water Management

Information from the USDA Natural Resource Conservation Service

Photo by Emily Case, NDEE

Agriculture is the largest water user in the U.S. Farmers and ranchers can save energy—and money—by improving their irrigation water management.

As premier stewards of our nation's private lands, farmers and ranchers have several available options that can help save energy while they implement the latest conservation technologies. Irrigation water management plays a crucial role in the conservation of water, and it can also save the producer money.

Agricultural water supply is emerging as a critical natural resource issue. Irrigated agriculture is essential in meeting our food and fiber production needs. As the nation's largest water user, agriculture accounts for about 80% of the country's annual water consumption.

Irrigation water management encourages the application of water in an amount that meets the need of the growing plant in a manner that avoids extended soil saturation and runoff. By increasing application precision and reducing unneeded applications, water can be conserved and energy can be saved.

According to the 2018 Farm and Ranch Irrigation Survey, approximately 56 million U.S. acres are under irrigation. Studies on the High Plains show that if the acres under medium pressure systems were converted to low pressure, the energy savings could add up to $15 per acre. The conversion of high-pressure systems to low pressure could result in savings of up to $66 per acre.

Other types of irrigation systems can be upgraded to increase irrigation efficiency. Switching from high or medium pressure drip sprinklers to low pressure systems can conserve water and reduce distribution costs.

In Nebraska, nearly a quarter of irrigation pumps are powered by diesel. Improving water-use efficiency can save on diesel consumption and funds spent on fuel.

Another option is to replace old diesel irrigation engines with newer electric models. The Nebraska Department of Energy administers the Clean Diesel Rebate program, which does just that. This program is funded by grants from the U.S. Environmental Protection Agency and has completed 62 projects since 2017 with rebates totaling over $900,000. This switch to electric engines also reduces emissions that would otherwise be caused by the use of diesel engines.

In addition to improving irrigation pumping and application systems, producers can convert to crops that use less water or implement a water recovery program.

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NREA Youth Energy Leadership camp broadens knowledge of energy industry

by Amanda Woita
Public Information Officer

The Nebraska Rural Electric Association will hold its Youth Energy Leadership Camp this summer after the COVID-19 pandemic forced the camp to take a year off in 2020.

The camp will take place July 19-23 at the Nebraska State 4-H Camp near Halsey. It's open to any Nebraska student, in ninth, 10th or 11th grade, whose home is served by one of NREA's member utilities. NREA's camp will follow COVID-19 safety guidelines set by the State 4-H Camp.

Photo courtesy NREA

The Nebraska Rural Electric Association's Youth Energy Leadership Camp teaches high school students more about the energy industry—like trying pole climbing—and gives them a chance to develop leadership skills.

Wayne Price, public affairs director for NREA, said the camp first started in the 1980s as a way to get students to think about energy conservation.

"It's kind of morphed over the years," Price said.

Later, the camp became the Youth Energy Leadership Camp, and offered a trip to Washington, D.C. to three students who are selected to be ambassadors.

Students interested in becoming an ambassador can participate in a competition of sorts. First, they prepare an introduction that they present to the other campers. The students vote and 10 participants move on to the next round, where they give speeches at the camp banquet. The other students vote again, and the top boy, the top girl, and the third participant with the most votes are chosen as Nebraska's ambassadors to the National Rural Electric Cooperative Association's Rural Electric Youth Tour in Washington, D.C. the following summer.

But it's not all a competition. Price said the students get to canoe, play volleyball, participate in a talent show, attend a dance and participate in other typical camp activities.

And because of the camp's electric roots, the students also get to do activities that are related to the energy industry, like pole climbing, bucket truck rides, and high voltage safety demonstrations. The students go on tours of Gerald Gentleman Power Station and the Kingsley Hydroelectric Power Plant.

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Price said there is also a session with a Nebraska Public Power District educator, who provides a hands-on, problem-solving activity.

"They definitely have to use their brains," Price said. "it's fun to watch the kids try to solve that problem. And the solutions they come up with – I wouldn't think of it in 100 years."

The adult camp counselors work in the energy industry, Price said, adding that many attended the youth camp when they were students.

"They have good memories of this camp," Price said.

He said the counselors give presentations about their jobs. Because many students may have an interest in going into the energy industry, or they're trying to learn more, the job presentations and the tours help them understand the many different roles that play a part in the industry.

Students who are interested in attending the camp must contact their NREA member utility to apply. Price said that while many students may come to the camp unsure of what they want to do, or not knowing much about the energy industry in Nebraska, they often learn more about what public power is, how it started, and more about the history of public utilities – including who George Norris was.

Photo courtesy NREA

While the Youth Energy Leadership Camp has a focus on energy, the students also get to participate in other camp activities like canoeing.

"This broadens their knowledge," Price said.

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Spring brings energy saving opportunities

Information from the U.S. Department of Energy

This spring marks the end of a long, brutal winter for much of the United States. With the start of a new season comes a fresh opportunity to find ways to save energy and money.

The U.S. Department of Energy has just a few simple things you can do to improve the energy efficiency and comfort of your home as warmer temperatures arrive:

1. **Service your air conditioner.** Easy maintenance such as routinely replacing or cleaning air filters can lower your cooling system's energy consumption by up to 15%. Also, the first day of spring could serve as a reminder to check your air conditioner's evaporator coil, which should be cleaned annually to ensure the system is performing at optimal levels.

2. **Open windows.** Opening windows creates a cross-wise breeze, allowing you to naturally cool your home without switching on air conditioners. This is an ideal tactic in spring when temperatures are mild.

3. **Use ceiling fans.** Cooling your home with ceiling fans will allow you to raise your thermostat four degrees. This can help lower your electricity bills without sacrificing overall comfort.

4. **Cook outside.** On warmer spring days, keep the heat out of your home by using an outdoor grill instead of indoor ovens.

5. **Install window treatments.** Energy efficient win-dow treatments or coverings such as blinds, shades and films can slash heat gain when temperatures rise. These devices not only improve the look of your home but also reduce energy costs.

6. **Caulk air leaks.** Using low-cost caulk to seal cracks and openings in your home keeps warm air out—and cash in your wallet.

Photo by Connor Olson on Unsplash

There are several ways to save on your energy bill during the spring, like cooking outside to keep the heat out of your home.

7. **Bring in sunlight.** During daylight hours, switch off artificial lights and use windows and skylights to brighten your home.

8. **Set the thermostat.** On warm days, setting a pro-grammable thermostat to a higher setting when you are not at home can help reduce your energy costs by ap-proximately 10 percent.

9. **Seal ducts.** Air loss through ducts can lead to high electricity costs, accounting for nearly 30% of a cooling system's energy consumption. Sealing and insulating ducts can go a long way toward lowering your electricity bills.

10. **Switch on bathroom fans.** Bathroom fans suck out heat and humidity from your home, improving comfort.

Check out DOE's home cooling and landscaping info-graphics for more ways to cut energy costs this spring.

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

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