Nebraska Energy Quarterly

NEBRASKA
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DEPT. OF ENVIRONMENT AND ENERGY

June 2021

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DESL program provides low-interest loans for energy efficiency projects

The Nebraska Department of Environment and Energy's Dollar and Energy Saving Loans (DESL) program works with the state's lending institutions to provide low-interest loans to Nebraskans who want to make energy efficiency improvements in their homes or buildings.

Between March 1990 and June 20, 2020, NDEE's DESL program helped finance more than 30,000 energy saving projects across Nebraska's 93 counties. These projects total more than $369 million, with NDEE providing more than $183 million from its revolving loan fund. The state's participating lenders have provided more than $138 million in funds, and the balance of roughly $47 million was spent by borrowers.

NDEE Grants Section Supervisor Aaron Miller, who used to serve as the DESL Division chief, said the fact that the DESL program is used across the state is significant.

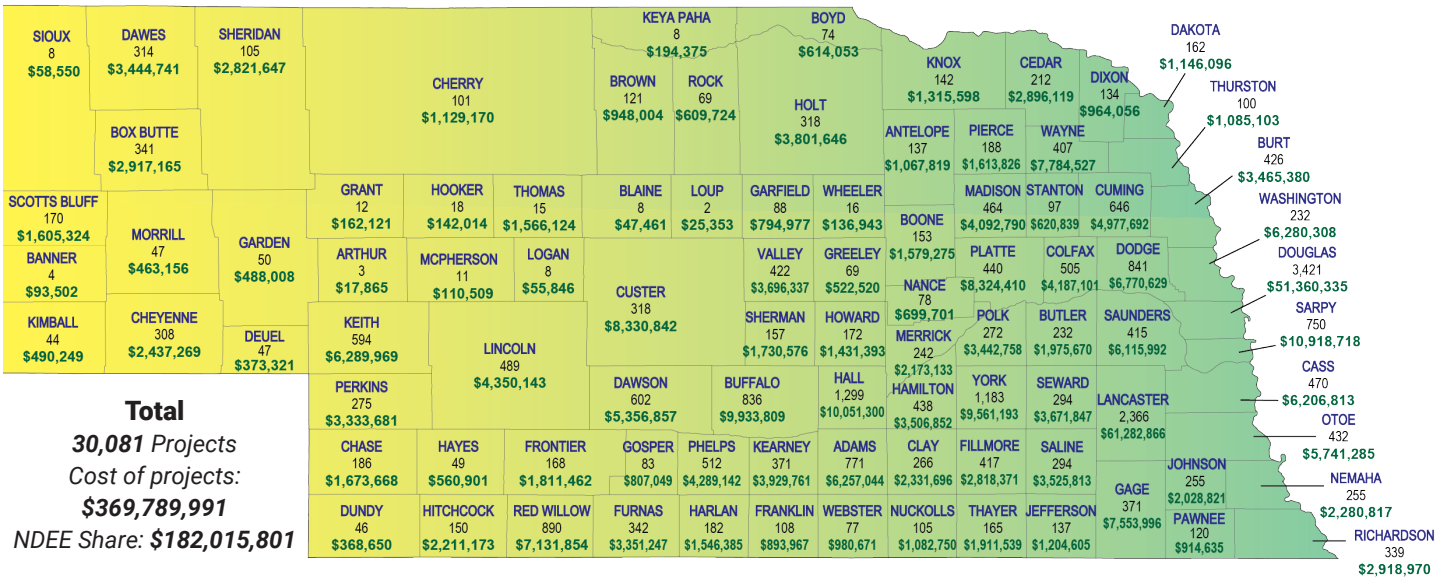
"It's rewarding to know the DESL program has had a part in projects state wide," Miller said. "Not only does this program provide low-interest loans to Nebraskans, the energy efficiency measures can lead to savings on energy bills."

The DESL program was created using oil overcharge funds. During a period of federal price controls from 1973 to 1981, oil companies overcharged their customers. Courts ordered the companies to pay indirect restitution by providing funds to states, and the states used those funds to create energy assistance and efficiency programs.

Nebraska used those funds to create the DESL program, which is a revolving loan fund; money from borrowers' loan repayments is put back into the program, according Miller. He said a few other states used their funds as grants.

"The state is unique in how it continues to use the original oil overcharge funds," Miller said. "All the funding we put in comes back to NDEE, and it can continuously recycle that money and fund projects throughout the state."

Number of DESL Projects by County and Dollar Amount of Projects as of June 30, 2020



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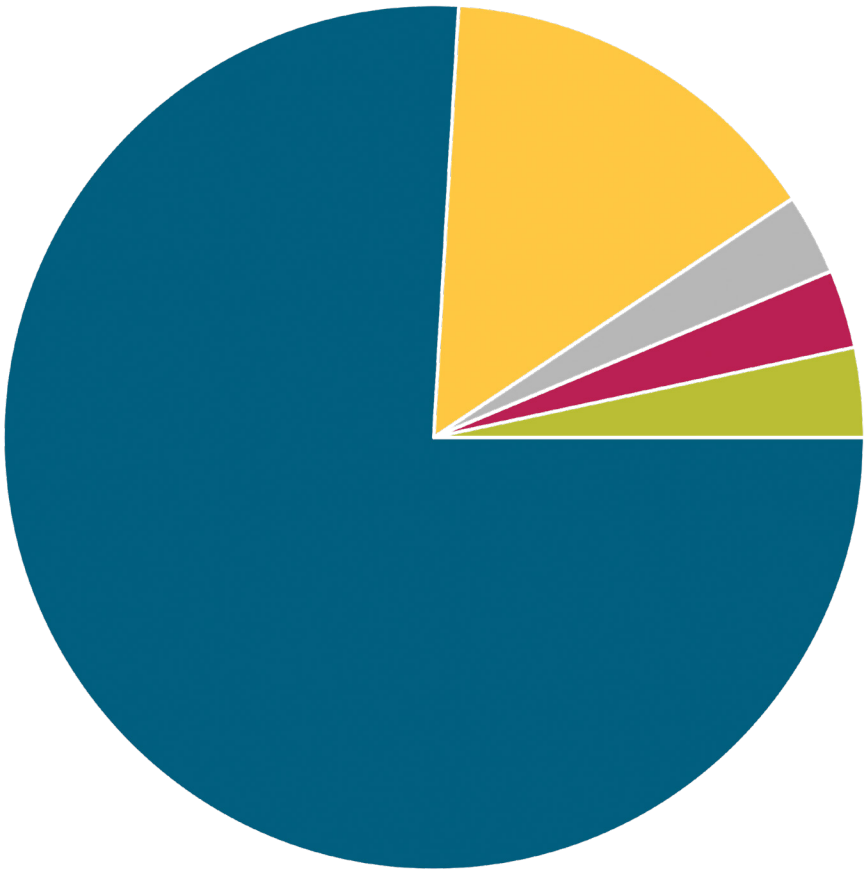
Total DESL Funds Invested by Project Category
as of June 30, 2020



Residential
Total costs of projects: $280,781,593
NDEE Share: $132,301,422
28,000 Projects

Commercial/Industrial/ Local Government
Total costs of projects: $54,553,556
NDEE Share: $28,971,566
1,312 Projects

Agricultural
Total costs of projects: $11,258,281
NDEE Share: $5,508,496
581 Projects

Transportation/ Telecommunications
Total costs of projects: $10,834,937
NDEE Share: $6,850,839
42 Projects

Wind, Solar and Fuel Cells
Total costs of projects: $12,361,623
NDEE Share: $8,383,477
146 Projects

The DESL program was later augmented with funds from the American Recovery and Reinvestment Act of 2009.

Nebraska residents, businesses, non-profits, local governments and school districts are among those that can apply for a DESL loan. Those interested in receiving a loan can start the process by applying though their lending institutions.

Miller said once the lender has granted preliminary approval, it sends the application to NDEE to review the proposed project. If the project qualifies and meets energy requirements, NDEE lets the lender know the project can proceed. The applicant and the lender work to complete the loan process.

The lender and NDEE sign a participation agreement, and NDEE provides a percentage of the loan, which allows the bank to provide a lower interest rate to the applicant.

A few typical improvements that can be financed through this program include:

- Adding insulation to walls, floors, ceilings, attics and other building envelope surfaces
- Replacing inefficient furnaces, air conditioners and heat pumps
- Replacing doors and windows
- Upgrading lighting
- Adding photovoltaic systems
- Replacing irrigation pumps and motors
- Replacing grain dryers

For more information, visit NDEE's website.

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NDEE energy programs now housed under Planning and Aid Division

The Nebraska Department of Environment and Energy recently reorganized its internal structure, as reported in a previous Nebraska Energy Quarterly. That change means the former Energy and Assistance Division is now housed within the new Planning and Aid Division.

The Planning and Aid Division was created to bring together all the NDEE programs that provide grants, loans and other funding to Nebraskans. Previously, these programs were organized with the media they worked with – water, air, land and energy.

The programs within the Planning and Aid Division include:

- **Water Planning Section**, which provides funds for water quality projects like Nonpoint Source Water Quality Grants and Source Water Protection Grants. This section also organizes the Surface Water Quality Integrated Report.
- State Revolving Fund Section, which provides loans to communities to improve their drinking water or wastewater infrastructure.
- Dollar and Energy Saving Loans and Planning and State Energy Programs **Section,** which provides loans for Nebraskans who are making energy efficiency improvements to their homes, businesses or other buildings. (See DESL Program story in this edition).
- Grants Section
  - o ***Waste and Air Grants Group***, which comprises the Waste and Air grants group. It offers:
    - Waste Reduction and Recycling Incentive Grants
    - Litter Reduction and Recycling Grants
    - Illegal Dumpsite Cleanup Program
    - Landfill Disposal Fee Rebate Program
    - Clean Diesel Grants, which funds the replacement of old diesel school buses
    - Clean Diesel Rebates, which funds the replacement of old diesel irrigation engines and old diesel trucks
    - Volkswagen Environmental Mitigation Trust
  - o ***Weatherization Group***, which provides funds for Nebraskans with low incomes to make weatherization improvements on their homes.

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Now that the programs are organized together and working in the same physical area, Planning and Aid Division Administrator Sarah Starostka said they are learning from each other's processes and finding tools from some programs that could be used in others.

For example, the DESL program began an electronic signature process through DocuSign after the onset of the pandemic. Teammates who work in the DESL program have been able to share their experience and help other programs implement electronic signatures. Starostka said she sees other opportunities for team members to share their knowledge or lean on the experience of others while developing new tools.

Starostka also said the division is evaluating ways it can provide coordinated assistance to its customers. She said the Planning and Aid division is looking for ways to work together when a community project qualifies for multiple programs. That way, communities can make their own dollars go further.

"We'd like to provide a one-stop shop for communities and customers seeking financial assistance on various fronts," Starostka said. "Focusing on proactive outreach efforts will ensure that our customers are aware of the many resources available to help meet their environmental, energy, and financial assistance-related needs and goals."

Starostka said the reorganization is going well. While there are adjustments to make with any change, she said team members throughout the division are meeting those challenges.

"We have an experienced and knowledgeable team that has a lot of great ideas," Starostka said. "I am excited to see where we go from here."

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UNL demonstration shows E30 safe in non-flex fuel vehicles

On March 8, Governor Pete Ricketts announced the results of a E30 demonstration project conducted by the University of Nebraska-Lincoln (UNL) with support from the State's Department of Administrative Services (DAS). The ground-breaking research clearly demonstrates that E30, gasoline blended with 30% ethanol, is safe for long-term use in non-flex fuel vehicles (FFVs). A summary of the research is available by clicking here.

Photo by Amanda Woita, NDEE

The University of Nebraska-Lincoln has completed a demonstration that shows E30 fuel is safe to use in non-flex fuel vehicles. This demonstration was permitted by the U.S. Environmental Protection Agency and with support from the Nebraska Department of Administrative Services.

"The research partnership between the state and the university clearly demonstrates that E30 is a safe and reliable fuel for vehicles," Ricketts said. "Ethanol saves drivers money at the pump, is good for air quality and creates opportunities for our farm families. This study will be a great aid as we advocate for growing the volume of E30 in our nation's fuel supply. In turn, raising demand for E30 biofuel will benefit Nebraska's corn growers who supply 35% of their crop to our state's ethanol industry."

A team at the UNL Engineering Department—led by Dr. Rajib Saha, assistant professor of chemical and bimolecular engineering—completed a summary of the E30 demonstration and reported the safety of using the fuel in non-FFVs. The team reached its conclusion after a yearlong demonstration, permitted by the U.S. Environmental Protection Agency (EPA), compared various data points among a fleet of state-owned, non-FFVs. The full results of the demonstration will be released after being peer reviewed.

"There has been inconsistent messaging that using higher blends of ethanol reduces the fuel efficiency or wears down parts," said Adil Alsiyabi, the primary UNL researcher of the E30 demonstration. "But what the results show is that none of that is true. By going through rigorous testing, we've proven that higher ethanol blends do not decrease efficiency or compromise engine performance. Our goal was to find out if the vehicles on the road today can use ethanol blends up to E30 with no loss in fuel mileage and no mechanical issues."

The demonstration captured data using On-Board Diagnostics (OBD) devices on approximately 50 vehicles through both warm and cold seasons. When the engine was started, the device captured millions of data points, giving UNL researchers an opportunity to monitor fuel efficiency, vehicle performance, emissions control systems and many more systems. Additionally, drivers kept a log each time they filled up and provided their experience in regards to maintenance and efficiency.

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"We were not surprised by the results," said Roger Berry, administrator for the Nebraska Ethanol Board. "I am encouraged that we now have hard facts that show E30 can safely be used in vehicles other than flex fuels. Our next step will be to demonstrate this to the EPA and auto manufacturers and to change their recommendations. I personally have been a long-time user of higher ethanol blends in my conventional vehicles and have had no issues. Ethanol is a widely studied fuel. More people will start to see ethanol's benefits as we continue to provide the facts through projects like this."

Under U.S. EPA current guidelines, only FFVs can use blends higher than E15. This demonstration confirms that today's conventional vehicles can safely and economically use E30. Since ethanol is made locally from Nebraska corn, it is often cheaper than other gasoline options. Ethanol also replaces toxic chemicals found in gasoline with renewable octane—making it a healthier, cleaner fuel.

Making E30 more widely available will also help the ethanol industry stay competitive among transportation innovations as the country works to reduce its carbon footprint. Traffic is one of the highest contributors to carbon pollution which has been linked to cancer, heart disease and increased respiratory issues. By using fuels blended with ethanol, drivers reduce greenhouse gases by 46%. According to Growth Energy, a national ethanol organization, if the U.S. transitioned from E10 to E15, greenhouse gas emissions (GHG) would be lowered by 17.62 million tons per year, which is the equivalent of removing approximately 3.85 million vehicles from the road. Increasing the amount of ethanol in the blend will continue to decrease harmful emissions.

"Using E30 is just as effective in eliminating carbon emissions as electric vehicles (EVs) when you compare 'well to wheel' emissions of the two types of vehicles," said Jan tenBensel, chairmen of the Nebraska Ethanol Board. "That puts ethanol in a good position to help achieve our climate goals as a nation."

"DAS is proud to have been a part of this successful E30 pilot study," said DAS Director Jason Jackson. "Our team with Transportation Services Bureau has done a great job working along side state and federal partners to deliver accurate and reliable data for the study."

Berry said the Nebraska Ethanol Board plans to work with industry partners and the EPA to continue E30 demonstrations, which have gained interest from other state governors.

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Routine projects mean reliable electricity

Reprinted with permission from OPPD's The Wire by Jason Kuiper

Photo courtesy OPPD

Omaha Public Power District has more projects underway now than in previous years to ensure its customers receive reliable electricity.

All across the Omaha Public Power District (OPPD) service territory, projects are underway to help customers receive some of the country's most reliable electricity.

It is one of the hallmarks of public power – locally controlled utilities re-investing in infrastructure to maintain reliability while delivering affordable rates.

OPPD customers can now track those projects on the new Projects in Your Neighborhood page.

"Our team is focused on improving reliability for our customers," said David Spargo, manager of Asset Management & Maintenance at OPPD. "We use data and metrics to identify areas with performance gaps, take steps to inspect and ascertain reliability improvements, and coordinate with engineering and field crews to implement the improvements."

More projects planned

More projects are underway now than in previous years. OPPD increased spending in areas such as tree-trimming and underground equipment replacement. Like all utilities, OPPD must routinely inspect aging infrastructure to make sure it is working properly. OPPD must also replace equipment nearing its end of life.

"Before, it was replacing smaller segments of equipment and infrastructure," said Don Mitchell, lead engineer in the Asset Management & Maintenance department. "We know we have equipment that is aging. That's why we look at the data and identify poor-performing circuits. We inspect it and come back with an assessment, whether it is something like needing to add wildlife cover, extra tree-trimming or equipment replacement."

OPPD uses a variety of inspection methods, including ground inspections, drone inspections and manned aerial inspections with a helicopter. Mitchell said the work is often dictated by performance more than age.

Spargo and his team also work with many departments across OPPD to investigate and analyze circuit performance and issues.

"Our monthly meetings get very detailed," Mitchell said. "We go into the circuits and scrutinize how they are doing. Our reports show our circuit interruptions over the last 12 months. The goal is to try and identify performance issues before they become a wider problem."

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From forestry to devices

Spargo said reliability work takes place all across the service territory. There are ongoing projects in both the Omaha metro area as well as the rural areas to the north and south.

In the metro area, much of the work is focused on forestry issues, animal interference and vehicle crashes. In the rural areas, the projects tend to be more spread out due to population density.

One example of work that addressed ongoing issues was in Saunders County, near Ceresco. In that case, aging underground cable and issues with overhead lines were identified and repairs and replacements were made.

Photo courtesy OPPD

OPPD customers can track the utility's projects on its website. This webpage also shows the projects' locations, start dates and maps.

Another recent example was the use of recording devices placed in padmount transformers in Carter Lake and near downtown Omaha to check power quality in those areas. The devices record voltage and amps and then the data is analyzed to determine if it is an OPPD or customer issue. Such devices can also be placed in individual customer's meters or, for wider issues, in substations.

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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.

This edition's Nebraska by Numbers will focus on energy in the transportation sector. The information below comes from the statistics page, and the 2020 Annual State Energy Report, unless otherwise noted.

Nebraska ranks...

37th in energy consumption in the transportation sector

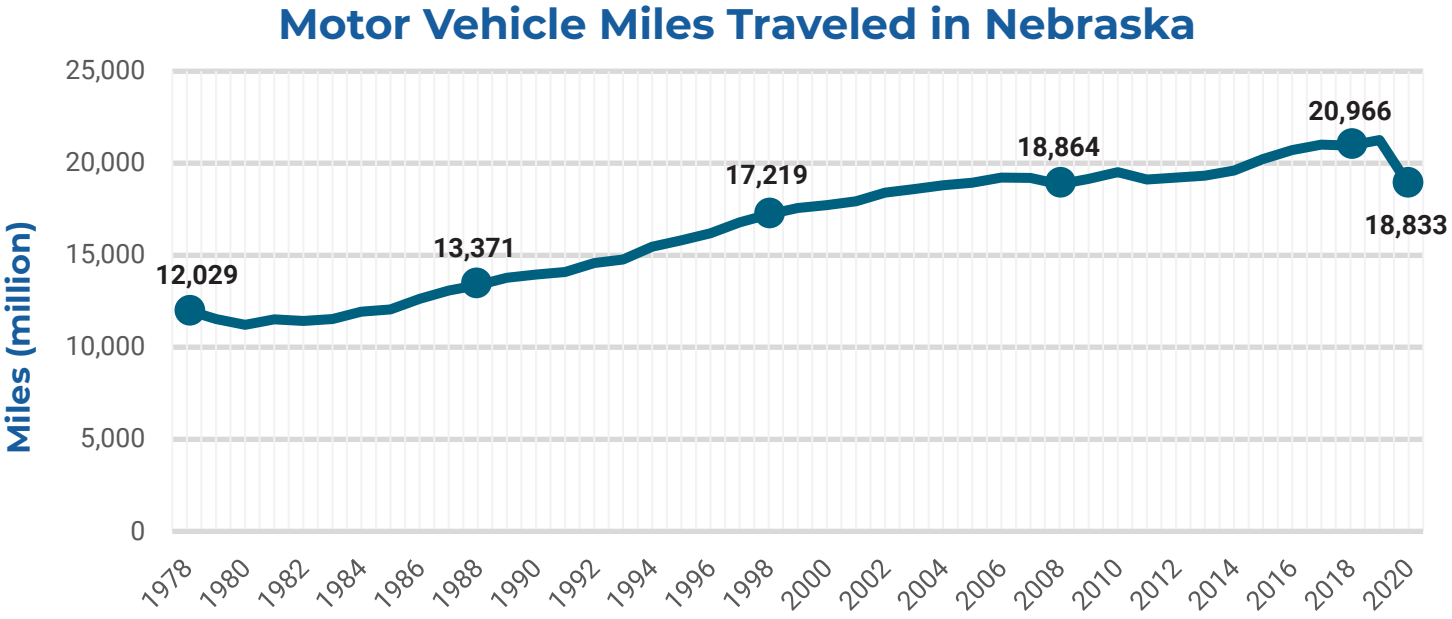
Nebraska consumed 212.4 trillion Btus of energy in 2018 in the transportation sector alone. The transportation sector includes public and private vehicles, railroads and aircraft, as well as energy used to transport oil and natural gas thorugh pipelines.

2nd in ethanol production

In 2018, Nebraska produced 2.2 billion gallons of ethanol, or 14% of the nation's total capacity. The state produces 25 times more ethanol than what it uses, meaning 96% of Nebraska ethanol is exported.

17th largest state

Nebraska's size means there's long distances between locations, which contributes to energy demands in the transportation sector.



Nebraska Department of Transportation

The transportation sector accounted for **23%** of Nebraska's total energy demand in 2018.

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Precision agriculture can save energy

Information from the USDA Natural Resource Conservation Service

American producers can save significant amounts of energy by implementing precision agriculture practices on their land. For example, if guidance systems were used on 10% of the planted acres in the U.S., fuel use would be cut by 16 million gallons, herbicide use by 2 million quarts and insecticide use by 4 million pounds per year.

Less fuel, natural gas, herbicide and insecticide used on the farm results in financial savings for the producer. Using a guidance system on a 1,000-acre farm with a continuous corn crop would reduce overlap from 24 inches to 2 inches, and result in savings valued at approximately $13,000 per year. Producers find that a guidance system can pay for itself in just two to three years.

Precision agriculture, also known as "site-specific crop management," is an information- and technology-based agricultural management system used to identify, analyze and manage variability within fields for optimum profitability, sustainability and environmental protection. Fields often vary in soil types, elevations, soil chemistry, fertility and productivity. By applying precision agriculture practices, producers are able to specify the farm input needs (including nutrient and pesticide application, tillage and irrigation) throughout an individual field.

Photo by Taylor Siebert on Unsplash

Precision agriculture equipment can reduce fuel, herbicide and insecticide use on farms—saving both energy and money for the producer.

Free public access to the Federal Global Position System (GPS) has made it economically possible for producers to use new precision tools, techniques and services to enhance their efforts to save energy and reduce costs. These include yield monitoring, grid soil sampling, variable-rate application of nutrients, remote-sensing applications, soil electrical conductivity (EC) monitoring and zone soil sampling.

In addition to cutting production costs and saving energy, precision agriculture reduces environmental pollution and improves water quality by reducing nutrient runoff. Other benefits include:

- Improved crop yield
- Reduced compaction by limiting traffic to specified travel lanes
- Increased opportunity to operate equipment after dark
- Labor savings through reduced implement overlap
- More accurate farming records

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UNL Industrial Assessment Center assists manufacturers, prepares future engineers

by Dr. Bruce Dvorak, Ph.D, P.E.
Assistant Director, NIAC

The Nebraska Industrial Assessment Center team at the University of Nebraska-Lincoln (UNL) provides no-cost assessments on energy efficiency and waste reduction for small- and medium-sized manufacturers in Nebraska and neighboring states. UNL is one of 31 higher-education institutions from 25 states that operates an Industrial Assessment Center (IAC).

Photo courtesy NIAC

University of Nebraska-Lincoln engineering students Sarah Porath and Jack Micek collect data from a rotor motor while visiting Aurora's wastewater treatment plant. Students visited the plant through the Nebraska Industrial Assessment Center, where students conduct assessments at qualifying manufacturers/facilities and provide a report that outlines energy-saving measures those facilities can adopt.

Nebraska Industrial Assessment Center (NIAC) offers no-cost energy, productivity and waste assessments for qualifying manufacturers. A manufacturing site with fewer than 500 employees and annual energy bills between $100,000 and $3.5 million qualify for this free program.

Assessments are conducted over the course of a day. The NIAC team of university faculty and students then prepares and delivers a comprehensive report that provide specific details on all cost-saving opportunities identified during the assessment, descriptions of existing conditions, energy profiles, applicable rebates and incentives and recommendations with simple payback periods.

To ensure the client receives an accurate and thorough report, the NIAC collects as much raw data as possible during the assessment, using a variety of techniques and equipment that may be unavailable at a facility. These include infrared thermography, ultrasonic compressed air leak detection, combustion analysis and ultrasonic water flow measurement. The collected data serve as the foundation for the engineering analysis performed by NIAC student assessors.

The goal of the assessments is to offer a client a range of valuable recommendations, supported by solid engineering analysis. Student assessors typically focus their efforts on five to 10 formal recommendations. These recommendations generally include lighting, air compressors and boiler systems, but there are usually additional facility-specific recommendations included in the reports. These offer ideas for using chillers or heat exchangers to reduce overall energy use, finding more energy efficient alternatives to inefficient or aging equipment or introducing novel solutions to unique or site-specific problems.

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Tom Rathe, account executive at Lincoln Electric Systems, noted that many small manufacturers do not have the money and/or people to do what the NIAC does.

"They may not even realize the potential energy savings," he said, and added that many of these smaller manufacturers "really embrace what is being said."

In addition to helping manufacturers in the state, the NIAC also educates the next generation of engineers to be mindful of energy efficiency and waste prevention as they enter the workforce.

Daniel Johnson graduated from UNL in 2019 where he majored in chemical engineering. He interned with the UNL Partners in Pollution Prevention (P3) program the summer after his sophomore year, where he worked with Purina. He then worked with NIAC the rest of his college career. He was offered an internship with Purina the summer after he worked with P3. After graduating, Johnson took a job with Exxon.

Photo courtesy NIAC

Students with UNL's Nebraska Industrial Assessment Center collect equipment data at the City of Auburn Utilities.

"Even though you're working as kind of an environmental engineer and doing waste reduction, you're doing a lot of things that will be applicable to any sort of job you might have," Johnson said. "Whether you're a mechanical engineer, chemical engineer or electrical engineer you're collaborating with people and problem solving and troubleshooting. And those are things that you're going to run into in your career after you graduate, so it's really beneficial from that aspect."

Photo courtesy NIAC

Britt Hoge, an engineering student at UNL, collects data from an industrial pre-treatment system at a wastewater treatment facility. The university's Nebraska Industrial Assessment Center gives students real-world experience, and in return, manufacturers and facilities receive information on how they can improve their energy efficiency.

The NIAC recently released two video series – 16 videos total – to help manufacturers reduce energy usage and save money. The short videos are a great first step to learning how to improve energy and waste efficiency at a plant or organization.

The first series is called "Top IAC Recommendations," where the most common suggestions given to manufacturers to improve elements such as heating, lighting and insulation in order to reduce cost and waste are provided.

The second series focuses on the "Relative Cost of Water: Water Mapping and Water Heating," and will benefit any facility using water in their processes. These videos can be found on at https://go.unl.edu/niacvideos.

Visit the NIAC website to see if your facility is eligible for a no-cost assessment at https://engineering.unl.edu/iac/iac-clients-0/ or contact NIAC Director, Dr. Bob Williams, at rwilliams2@unl.edu.

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16 ways to save money in the laundry room

Information from the U.S. Department of Energy

Laundry is no one's favorite chore, and it doesn't help that washers and dryers are among the costliest appliances to operate. Since most of us do at least a few loads of laundry each week, it's worth taking steps to reduce energy use.

Here's how your washer and dryer compare to two other high energy users in your home—your refrigerator and dishwasher:

- Clothes Washer—590 kwh
- Clothes Dryer—769 kwh
- Refrigerator—596 kwh
- Dishwasher—206 kwh

If you're in the market for a new washer and dryer, new efficient options are available that will save you money over the long term.

Photo by Daniel Spase on Unsplash

Clothes washers and dryers use large amounts of energy. Letting clothing air dry is one way to save money and energy when doing laundry.

But there are ways to save money and energy in the laundry room and reduce the wear and tear on your clothes—and some of them won't cost you a thing. Here are some things you can do to save in the laundry room:

1. Wash with cold water.
Using warm water instead of hot can cut a load's energy use in half, and using cold water will save even more. Cold water detergents can be helpful to ensure items get clean, and high-efficiency detergents (indicated by the "he" symbol) should be used when required by the manufacturer.

2. Wash full loads.
Your washer will use about the same amount of energy no matter the size of the load, so fill it up.

3. Dry right-sized loads for your machine.
If the dryer is too full, it will take longer for the clothes to dry. Loads that are too small can also take longer to dry, plus you spend more per item when running the dryer to only dry a few things.

4. Air dry when you can.
Hang laundry outside or on a drying rack to avoid using the dryer altogether.

5. Switch loads while the dryer is warm.
This will allow you to use the remaining heat inside of the dryer for the next cycle.

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6. Use dryer balls.
Wool or rubber dryer balls will help separate your clothes and get more air to them, cutting drying time. They can also reduce static so you don't need dryer sheets (see #7 below). The wool balls are said to absorb some moisture, further cutting drying time.

7. Clean the lint filter on the dryer.
The dryer will run more efficiently and safely. If you use dryer sheets, scrub the filter once a month with a toothbrush to remove film buildup that can reduce air circulation.

8. Use the high-speed or extended spin cycle in the washer.
This will remove as much moisture as possible before drying, reducing your drying time and the wear on your clothes from the high heat of the dryer.

9. Use lower heat settings in the dryer.
Even if the drying cycle is longer, you'll use less energy and be less likely to over-dry your clothes.

10. Dry towels and heavier cottons separately from lighter-weight clothes.
You'll spend less time drying the lighter-weight clothes.

11. Use a cool-down cycle if your dryer has one.
This cycle allows clothes to finish drying with the heat remaining in the dryer.

12. Use the moisture sensor option if your dryer has one.
Many new clothes dryers come designed with a moisture sensor, which automatically shuts off the machine when clothes are dry. This will save energy and reduce wear and tear on your clothes caused by over-drying.

13. Sign up for time-of-day programs with your utility.
These programs offer lower energy costs at certain times of day—often overnight. If you can plan to do your laundry overnight (or use controls on your machine to schedule washing or drying), you can pay less to do your laundry. Contact your utility for more information.

14. Use an ENERGY STAR®-certified washer and dryer.
New ENERGY STAR washers use about 25% less energy than conventional models, and ENERGY STAR dryers use 20% less energy.

15. Consider a gas dryer.
Depending on gas and electric rates in your area, a gas dryer could cost less to operate, though it may cost a little more to purchase. Keep in mind a gas dryer does need a dedicated gas line.

16. Consider a heat pump dryer.
The initial cost may be a bit higher, but heat pump dryers can save 20%-60% over conventional dryers by taking in ambient air, heating it, and recirculating it. There are some things to consider if you decide to buy a heat pump dryer—namely sealing old dryer vents and drainage. Visit ENERGY STAR for more information.

To find out about how much you're spending to run your washer and dryer each year, use the U.S. Department of Energy's appliance energy use calculator.

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

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