Renewable, Efficient & Sustained
Energy saving programs that make sense
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About Nebraska Public Power District

Always there when you need us, NPPD’s mission is to safely generate and deliver reliable, low-cost, sustainable energy and provide outstanding customer service. Working in partnership with the state’s rural public power districts, cooperatives and municipalities, NPPD helps serve an estimated 600,000 Nebraskans in 86 of the state’s 93 counties with retail or wholesale electric power and energy-related products and services.
What Is “Sustainability”? 

There are many definitions and interpretations for what it means to be sustainable, but the Nebraska Public Power District (NPPD) defines it this way: Sustainability is a practice that balances environmental, societal, and economic needs, now, and in the future.

NPPD is proud of our record. By 2020, our commitment to sustainability will have delivered more than 300 megawatts of wind power to customers. We manage our hydropower facilities with care, maintain a strong, non-carbon emitting footprint, and continually research alternative energy sources.

Some may challenge the use of coal as an approach to sustainability, but with proper environmental controls, fossil generation provides economic and societal advantages to Nebraska, NPPD, and our diverse energy mix.

NPPD’s Generation Profile
Water, Wind and Watts!

A utility’s fluctuating electrical load mirrors the constant changes in consumer behavior. For NPPD, a summer-peaking utility, demand for energy increases in summer months when temperatures rise, air conditioners hum, and farmers irrigate. Many factors impact the supply of and demand for energy, such as the economy, fuel costs, advances in electrical technologies, and weather.

NPPD and our wholesale utility partners used our shared load management program to shave more than 650 megawatts of load from the system peak in 2012. When hydropower is combined with our wind and nuclear generation resources, NPPD’s generation portfolio is 40 percent carbon-free.

The old faithful of Nebraska’s renewables, hydropower plants are weather-dependent and rely upon canal and reservoir systems to deliver the “fuel” used to generate electricity. The North Platte Hydro is NPPD’s largest hydro facility, capable of generating 24 megawatts of electricity or enough power to serve approximately 6,700 residential customers.

**2012 HYDROPOWER ENERGY OUTPUT in megawatt-hours (MWh)**

<table>
<thead>
<tr>
<th>Plant</th>
<th>Energy Output (MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Platte Hydro</td>
<td>80,881 MWh</td>
</tr>
<tr>
<td>Spencer Hydro</td>
<td>2,441 MWh</td>
</tr>
<tr>
<td>Kearney Hydro</td>
<td>153 MWh</td>
</tr>
<tr>
<td>Jeffery Hydro</td>
<td>98,665 MWh</td>
</tr>
<tr>
<td>Johnson Hydro</td>
<td>139,082 MWh</td>
</tr>
<tr>
<td>Kingsley Hydro</td>
<td>83,748 MWh</td>
</tr>
<tr>
<td>Monroe Hydro</td>
<td>21,596 MWh</td>
</tr>
<tr>
<td>Columbus Hydro</td>
<td>83,306 MWh</td>
</tr>
<tr>
<td>WAPA UGP</td>
<td>924,963 MWh</td>
</tr>
<tr>
<td><strong>HYDRO TOTAL</strong></td>
<td><strong>1,434,835 MWh</strong></td>
</tr>
</tbody>
</table>
Learning - Always Learning
Technology changes as often as the wind blows in Nebraska. NPPD understands this and has long been an explorer of innovation and what could be the next answer in electrical generation.

Springview celebrates its first anniversary
In 1998, Nebraska’s first two wind turbines were installed outside of Springview. NPPD was a member of the utility consortium responsible for the construction to study wind generation in the state.

In 2007, operation of the 750-kilowatt turbines came to a halt due to their age, maintenance, and the inability to get spare parts. Three years later, Bluestem LLC proposed an opportunity to re-establish the site with two, 1.5 megawatt, direct-drive wind turbines, a relatively new alternative in wind generation. Members of the original consortium agreed to another demonstration project, and in 2012, Springview II celebrated its first-year anniversary, having generated 10,680 megawatt-hours of electrical energy and being available 40 percent of the time.

Partners in Springview II include Omaha Public Power District, Lincoln Electric System and the City of Grand Island.

DIRECT DRIVE DATA
Two, Vensys 77, 1.5-megawatt turbines

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>252 feet</td>
</tr>
<tr>
<td>Hub height</td>
<td>213 feet</td>
</tr>
<tr>
<td>Blades and rotor</td>
<td>39 metric tons</td>
</tr>
<tr>
<td>Tower structure</td>
<td>90 metric tons</td>
</tr>
<tr>
<td>Generator</td>
<td>42 metric tons</td>
</tr>
<tr>
<td>Rotor speed</td>
<td>17.5 rev. per min.</td>
</tr>
<tr>
<td>Wind speed output</td>
<td>29 miles per hour</td>
</tr>
</tbody>
</table>

Direct-drive turbines do not use the gear box traditionally used to increase the rotational speed of a large rotor to 700 revolutions per minute. Instead, electric inverters are used to synchronize the generator to the grid.
NPPD: Investing in wind since 1998

Since NPPD’s investment in the state’s first wind facility, Springview, wind has played an important role in NPPD’s generation mix. In 2012, NPPD celebrated the commercial operation of the Crofton Bluffs Wind Energy Facility and Broken Bow wind farms, bringing the total amount of wind generation in NPPD’s portfolio to 207 megawatts.

Year-end 2013 looks promising, too, with the expected purchase of 75 MW from the Steele Flatts wind farm and another 75 MW from a second wind facility at Broken Bow. With these, we are 45 MWs shy of our goal to generate 10 percent of our energy with renewables, primarily wind, by 2020.

### 2012 Wind Generation Output

<table>
<thead>
<tr>
<th>Facility</th>
<th>Megawatt-hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ainsworth</td>
<td>91,304 MWh</td>
</tr>
<tr>
<td>Elkhorn Ridge</td>
<td>136,372 MWh</td>
</tr>
<tr>
<td>Laredo Ridge</td>
<td>270,526 MWh</td>
</tr>
<tr>
<td>Bluestem-Springview II</td>
<td>6,801 MWh</td>
</tr>
<tr>
<td>Crofton Bluffs*</td>
<td>17,821 MWh</td>
</tr>
<tr>
<td>Broken Bow*</td>
<td>4,316 MWh</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1,348,876 MWh</strong></td>
</tr>
</tbody>
</table>

*Commercial operation began in fourth quarter 2012.

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**NEBRASKA PUBLIC POWER DISTRICT WIND GENERATION RESOURCES TO DATE**

- **2020 Renewable Goal = 357 MWs**
- **10% Renewable Goal Established by NPPD Board in Feb. 2008**

<table>
<thead>
<tr>
<th>NPPD Involved Wind Projects</th>
<th>Number of Turbines</th>
<th>Facility MWs</th>
<th>Nebraska Public Power District MWs</th>
<th>Omaha Public Power District MWs</th>
<th>Lincoln Electric System MWs</th>
<th>Municipal Energy Agency of Nebraska MWs</th>
<th>City of Grand Island MWs</th>
<th>Jacksonville Electric Authority MWs</th>
<th>Project Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ainsworth Wind Energy Facility</td>
<td>36</td>
<td>60</td>
<td>31</td>
<td>10</td>
<td>0</td>
<td>7</td>
<td>1</td>
<td>10</td>
<td>Nebraska Public Power District</td>
</tr>
<tr>
<td>Elkhorn Ridge</td>
<td>27</td>
<td>80</td>
<td>40</td>
<td>25</td>
<td>6</td>
<td>8</td>
<td>1</td>
<td>0</td>
<td>Edison Mission Group</td>
</tr>
<tr>
<td>Laredo Ridge</td>
<td>54</td>
<td>80</td>
<td>63</td>
<td>10</td>
<td>8</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>Edison Mission Group</td>
</tr>
<tr>
<td>Bluestem-Springview II</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Edison Mission Group</td>
</tr>
<tr>
<td>Crofton Bluffs</td>
<td>22</td>
<td>42</td>
<td>21</td>
<td>14</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>Bluestem LLC</td>
</tr>
<tr>
<td>Broken Bow</td>
<td>50</td>
<td>80</td>
<td>51</td>
<td>18</td>
<td>10</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>Edison Mission Group</td>
</tr>
<tr>
<td>Steele Flats (2013)</td>
<td>44</td>
<td>75</td>
<td>75</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Next Era Energy</td>
</tr>
<tr>
<td>Broken Bow II (2014)</td>
<td>184</td>
<td>75</td>
<td>30</td>
<td>45</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>To be determined</td>
</tr>
</tbody>
</table>
Wind Turbine Goes to School

In late 2011, a 110-foot wind turbine was erected on the Northeast Community College campus in Norfolk. In addition to generating electricity, the unit helps educate Northeast students earning a degree in the school’s wind energy program.

Throughout 2012, college students learned to climb, repel, and maintain the turbine, as well as necessary safety rescue procedures. The turbine features an 80-foot tower and 30-foot blades and is capable of producing up to 108 kilowatts of electrical capacity.

The electricity produced is purchased in its entirety by NPPD, and the environmental attributes from the generation of the electricity remain with Northeast Community College. This is an example of NPPD’s commitment to support the implementation of customer-owned distributed electrical generation.

Waste Not the Energy

Now seven years old, the OLean Energy Facility, a methane recovery operation owned by Danny Kluthe of Dodge, uses renewable energy derived from animal waste to generate electricity.

The 8,000-head, hog operation creates “fuel” that is captured and piped into a building where it powers an 80-kilowatt generator. The generator distributes electricity into power lines owned by Cuming County Public Power District.

In 2012, OLean Energy generated 99,287 kWh of electrical energy.

The facility has the ability to generate enough power to serve more than 30 homes for one year, based upon Nebraska’s average consumption. Much of the biogas generated at OLean in 2012 was used by the facility as transportation fuel.
LEED, Follow, or Get Out of the Way

NPPD’s Norfolk Operations Center continues to make its mark in the energy efficiency field. This year, its onsite renewable energy provided 13 percent of the building’s electrical needs, up from 9.2 percent generated last year.

Constructed in 2010, the facility’s Leadership in Energy Efficiency and Environmental Design Gold certification is earned through a five-step approach including sensible land use, efficient water use, conservation, energy efficiency, prudent use of materials and resources during construction, and ensuring indoor air quality.

Although the building is rife with “green” attributes, the primary driver for its certification is its energy savings. NOC employees in operations, customer service, and account management work daily to fulfill NPPD’s vision and mission with energy efficiency and conservation in mind.

In 2012, the NOC used about 761,000 kilowatt-hours (kWh) of energy, which was down from 875,000 kWh in 2011. NPPD hopes to see continued decrease in energy consumption in 2013.
In 2012, the Norfolk Operation Center’s approximately 45-kilowatt, Suncarrier photovoltaic panel generated 96,522 kWh of electrical energy. By following the sun, a tracking feature on the solar unit provides approximately 20 percent more energy than a stationary array of comparable size.

**NPPD’s Energy Resource Mix in 2012**

- **Coal** (45.0%)
- **Nuclear** (34.1%)
- **Gas & Oil** (2.3%)
- **Hydro & Renewable** (7.9%)
- **Purchases** (10.7%)

NPPD knows it is risky to generate electricity using only one fuel source. Diversity allows us to call upon our generation resources at their most economical and available times. Our energy portfolio balances the environmental, societal, and economic needs of our customers.

*Prior to sale of environmental attributes

**Combined Heat & Power**

In 2012, two Nebraska companies utilized combined heat and power at their industrial process facilities.

Great Western Sugar Cooperative of Scottsbluff, served by NPPD, and ADM Corn Processing of Columbus, served by Loup Public Power District, both used the combined process to increase their overall thermal efficiency.

Combined heat and power is the practice of utilizing steam produced at an industrial plant and using it for both generation of electricity and the heating requirements of the industrial process.

Coupling the electrical generation and industrial processes increases the overall thermal efficiency of the steam generation process.
Energy Efficiency Efforts

EnergyWise℠ Program Results

NPPD knows energy efficiency is a least cost resource that should be considered first in resource planning. NPPD’s EnergyWise℠ program is proof. The program achieved an annual savings of 24,371 MWh and an anticipated total-yield energy savings of 316,400 MWh.

NPPD’s EnergyWise℠ program utilizes $2.26 million in funding for a multitude of investments and initiatives. (See chart below.)

The program fulfills its objectives by partnering with NPPD’s wholesale customers to implement energy efficient practices and savings that enhance the quality of life for Nebraskans now, and in the future.

The investments ($) per program (without labor) are highlighted in the following chart:

Direct EnergyWise Incentives - $1,861,322

Outreach includes: 5 percent administration adder, dealer incentives, school kits, marketing, advertising, etc.
Keeping You EnergyWise℠

Approximately 700 public power customers and business partners across Nebraska receive an electronic service which provides technical, business, research, assistance, and information quickly, easily, and at no cost to them.

Called “Keeping You EnergyWise℠,” the e-newsletter includes a variety of topical articles, complemented by an online library of information and a database of technical documents and resources. The online portal also features targeted research tools and benchmark industry data.

The publication’s “Ask an Expert” hotline service helps customers who may need help problem-solving technical and marketing issues. There is no usage limit. All questions and answers are held in strict confidence; and answers are typically issued within 24-48 hours.

Tipping the Scale To Be EnergyWise℠

In 2012, NPPD continued providing monthly energy efficiency write-ups for use in electric utility newsletters or as bill stuffers. These tips are shared with all 76 of NPPD’s wholesale customers. Topics typically focus on how enduse customers can make the most efficient use of the power they buy. NPPD’s utility customers suggest many of the topics to be covered each year, which complement current efficiency issues, so customers can make the best decisions for themselves.

Beyond Being EnergyWise℠

Big Savings for Small Wastewater Plants

What began in 2010 as shared goals between the Nebraska Department of Environmental Quality and NPPD resulted in a comprehensive energy efficiency program for small, municipal, wastewater treatment facilities, which can require between 20 and 60 percent of a community’s energy budget due to the intensive energy needs required to move and treat drinking water and wastewater for its citizens.

The Environmental Protection Agency Region VII and the University of Nebraska Partners in Pollution Prevention Internship Program joined in the effort by performing two, initial energy efficiency audits in 2010 at various Nebraska wastewater treatment plants, followed by three more
in 2012. The program identifies potential energy savings of up to one-third of a wastewater treatment plant’s utility costs and comes with a self-audit checklist for communities to use themselves.

Each participant receives an energy audit report which satisfies the USDA RD requirement for each application. In addition to current energy use and potential energy savings related to the proposed project, the audit outlines projected savings, estimated as annual energy savings in BTUs, and projected payback in years.

Last year, NPPD’s Energy Efficiency Consultants performed 124 energy efficiency audits to support customer applications for the REAP energy efficiency program. Twenty six were successful:

- 6 commercial grants for a total of $82,194 and a $54,700 loan,
- 19 irrigation grants for $121,031, and
- 1 grain dryer grant for $19,655.

Grants: What We Don’t Take for Granted

What began as a synergy in 2005 between Nebraska’s utilities and the Nebraska USDA Rural Development Rural Energy has turned into a great story about agricultural customers saving energy and money.

NPPD offers its agricultural customers energy audits for irrigation and grain-drying operations to help them find opportunities to save money and gain efficiencies.

The USDA RD Rural Energy for America Program requires an energy audit before operators can apply for a grant, which covers 25 percent of the cost for efficiency upgrades.

DEED Grant, Green Home

In 2012, NPPD was awarded a $12,500 research grant by the American Public Power Association Demonstration of Energy and Efficiency Developments program. APPA is a national organization serving the interests of the nation’s more than 2,000 community- and state- owned electric utilities.

The DEED program sponsors and conducts
activities related to energy innovation that improve efficiency or lower the costs associated with serving consumers of publicly owned electric utilities. NPPD is a member of both APPA and DEED.

The grant is being used to document the design and construction of a high-efficiency home that uses current building science and best practices to deliver such things as affordable housing, lower energy costs, improved health, and the reduction of greenhouse gases and foreign energy supplies.

The house contains many energy efficient features, including a mechanical ventilation system, a two-stage, geothermal heat pump, CFLs with LED compliant fixtures and switches, and “low-e” windows containing krypton gas to stop heat movement. The home features the most energy efficient windows available for residential use and insulation. All appliances are ENERGY STAR™ certified.

Construction was documented throughout 2012, and the footage will be edited into an educational video with an instructional flyer and guide for potential new home customers, business partners in the home building industry, and fellow APPA member utilities.

Energy Education Grants Continue in 2013

As a member of the Nebraska Energy Assistance Network, NPPD awards grants to agencies to help educate families on better ways to manage energy needs.

The Network is a partnership of utilities, governmental agencies, regulators, and community leaders with the common goal to help Nebraskans use energy efficiently.

NEAN grants awarded in 2013 to seven agencies will support the purchase of 30 energy efficiency kits and educational training programs materials. The kits, along with a facilitation guide, are each valued at $700.
Energy Calculators Add Up to Savings for Online Customers

NPPD and our wholesale utility partners are focused on delivering exceptional service to all customers, all the time. Every day, customers seek energy information. To help them answer their own questions, provide first-call resolution for some high bill complaints, and reduce overall costs by decreased call volume for routine assistance, we offer online tools.

The year 2012 marked the fourth anniversary of partnering with APOGEE Interactive Inc., an industry-leading provider of online solutions and cutting edge energy efficiency tools for websites.

In addition to the Home Energy Calculator, the suite of APOGEE tools includes an Interactive Energy Home, a Home Energy Library, a Kids’ Korner, Fundamentals of Electricity, and six, special-purpose calculators (appliances, heating, irrigation, lighting, heat pump upgrade, and televisions).

During 2012, the Home Energy Calculator was accessed by 1,319 individual users. Visitors used it for modeling their home, receiving recommendations to improve their energy efficiency, and saving money.

Internal and External Training

Knowledge is fundamental to any energy efficiency program. That’s why, each year, NPPD educates our employees and offers training to fellow wholesale utilities on a variety of topics related to energy efficiency.

One training option is called a Joint Utility Meeting, where business partners and utility representatives come together to share knowledge, energy efficiency practices, products and goals. This sharing results in stronger business and utility relationships which ultimately benefit the end-use customer.

In 2012, NPPD sponsored two, Refrigeration Service Engineers Society Seminar Workshops to learn about cutting-edge technologies and products which help customers use energy wisely.

NPPD holds these RSES events on college

NPPD Energy Efficiency Supervisor Steve Zach presents at a Joint Utility Meeting.
campuses where students and staff also participate. The workshops are a win-win-win among the businesses who share their products; the college students who have an opportunity to discuss issues with peers of the industry they want to enter, and for all attendees to stay abreast of current and leading technologies.

NPPD also sponsored three, Distance Learning HVAC Training sessions using NPPD’s video conferencing system. This annual training provides interaction between a presenter and remote sites across the state where business partners can attend. One of the many topics covered in 2012 was providing credit for North American Technician Excellence certified technicians.

Finally, NPPD hosted two webinars in 2012 for large commercial and industrial customers. The first webinar was “Energy Auditing Industrial Equipment” where customers learned energy savings opportunities for various pieces of industrial equipment. The second webinar, “Energy Efficiency Investment Analysis,” discussed the economic nuts and bolts of energy efficiency projects.

Yet, interacting with other utilities and our trade allies is not enough. NPPD’s Energy Efficiency Team regularly keeps colleagues informed about NPPD’s EnergyWise℠ Programs.

Customer service representatives for NPPD and our wholesale partners receive training about home energy audits, demand metering, dos and don’ts of heating and cooling systems, space heaters. The one-hour, bimonthly training helps representatives be more knowledgeable when customers call.

Combined with weekly tips and stories published in NPPD’s electronic newsletter, available to wholesale utilities and employees statewide, the Energy Efficiency Team walks the talk when it comes to promoting sustainability.

**Other 2012 activities**

**Energy Detective Program Seeks Out Savings**

In 2012, the Energy Detective Program was used by 7,045 fifth-grade teachers, students and their families. NPPD and the State of Nebraska Energy Office fund the program, which is a proven blend of teacher-designed classroom activities. The hands-on, home projects include installing high-efficiency appliances and introducing resource-conscious behavior to students and their families.

**Putting Energy Efficiency on Display**

Last but not least, representatives from NPPD’s Sustainability Department participate in home shows and expos, as well as statewide events such as Husker Harvest Days and the Nebraska State Fair.