

# City of Lexington

## Energy Element

The purpose of an energy component within comprehensive plans allows the opportunity to prepare Lexington for future energy needs. Nebraska Legislation LB997 states that public jurisdictions are required to include an energy component into their comprehensive plans by January 2015. It allows residents to be informed of its energy use, costs, and consequences. This document will be added as the Energy Element for Lexington's obligation for its completed Comprehensive Plan.



Source: www.nppd.com; Canaday Station

## Legislation

### Nebraska Legislation LB997

According to LB997, there are three main components. These three components include the following:

**1. Energy infrastructure and energy use by sector, including residential, commercial, and industrial sectors.**

Energy infrastructure and energy use by sector for Lexington is found in the statistics section of the Energy Element document.

**2. Utilization of renewable energy sources.**

Energy source statistics are not available for Lexington, however there is a list found in the Renewable Energy Sources section of this document that shows what is possible in Nebraska.

### 3. Energy conservation measures that benefit the community.

Energy Codes – Under §§81-1608 to 81-1616, the State of Nebraska has adopted the International Energy Conservation Code as the Nebraska Energy Code. Any community or county may adopt and enforce the Nebraska Energy Code or an equivalent energy code. If a community or county does not adopt an energy code, the Nebraska Energy Office will enforce the Nebraska Energy Code in the jurisdiction.

The purpose of the Code, under §81-1608, is to ensure that newly built houses or buildings meet uniform energy efficiency standards. The statute finds:

*that there is a need to adopt the . . . International Energy Conservation Code in order (1) to ensure that a minimum energy efficiency standard is maintained throughout the state, (2) to harmonize and clarify energy building code statutory references, (3) to ensure compliance with the National Energy Policy Act of 1992, (4) to increase energy savings for all Nebraska consumers, especially low-income Nebraskans, (5) to reduce the cost of state programs that provide assistance to low-income Nebraskans, (6) to reduce the amount of money expended to import energy, (7) to reduce the growth of energy consumption, (8) to lessen the need for new power plants, and (9) to provide training for local code officials and residential and commercial builders who implement the . . . International Energy Conservation Code.*

The Code applies to all new buildings, or renovations of or additions to any existing buildings. Only those renovations that will cost more than 50 percent of the replacement cost of the building must comply with the Code. As of early 2013, Lexington has not adopted an energy code.

### Nebraska Legislation LB436 - Net Metering

The Nebraska Legislature passed LB436 which allows for net metering and gives citizens the opportunity to generate their own energy. It is found to be in the public interest because it encourages customer-owned renewable energy resources. It also can stimulate economic growth, encourage diversification of energy resources, and maintain low-cost, reliable electric service for the State of Nebraska. By supplementing electric bills through “credits” for energy purchased back from the utility company, the citizens of Lexington can save money and reduce pressure on the utility grid.

According to their website, NPPD has offered net metering since 2008. As of December 31, 2011, NPPD had 16 net metering qualified facilities with total generating capacity of 66.9 kilowatts. The total estimated amount of energy produced by these customer generators in 2011 was 82,151 kilowatt-hours, and the net kWh received from them was 2,015 kilowatt-hours. As of October 12, 2012, NPPD has 27 net meter installations for a total installed capacity of 117.7 kWh.

The City of Lexington is willing to work with residents who are looking to take advantage of this opportunity.

### Energy Usage Statistics

#### Consumption by Source

In the Electric Power Sector, Nebraska’s Energy Consumption in 2009 consisted of mainly two sources. 68.61% (242.326 trillion Btu) of consumption came from coal while the second highest use was 27.94% (3.326 TBtu) generated by Nuclear Electric Power.

According to the 2009 EIA State-Level Energy Consumption statistics, Nebraska was ranked 34th in total consumption with 759.1 trillion Btu. This consumption per person in Nebraska is 9th highest with 422.9 Million Btu. The upper Midwest Region is represented poorly for consumption per person with Wyoming, North Dakota, Iowa, South Dakota, Nebraska, and Montana in the top ten. This is due to the rural and agricultural nature of these states. Most of these states are found in the top ten of lowest prices for Dollars spent per Million Btu.

The agricultural economies and cheap prices lead to high energy consumption per person as well as less urgency to conserve these resources. It becomes a way of life and hard to change course with both isolated farmers as well as urban citizens who have low and affordable public prices. For example, the average monthly bill in Nebraska in 2007 was roughly \$78. In 2010 it rose to \$94. Nebraska’s energy consumption by source as it compares to the United States in 2010 is shown in Table 30.

#### ENERGY CONSUMPTION BY SOURCE

COAL	254.6 TBtu (31st)	20,869 TBtu
NATURAL GAS	169.6 TBtu (38th)	24,314 TBtu
PETROLEUM	222.1 TBtu (36th)	37,081 TBtu
RETAIL ELECTRICITY SALES	101.8 TBtu (36th)	12,810 TBtu
<b>NEBRASKA</b>		<b>United States</b>

#### CONSUMPTION PER CAPITA

<b>461.1 MBtu (8th)</b>	<b>315.9 MBtu</b>
<b>NEBRASKA</b>	<b>United States</b>

Table 32: Energy Consumption By Source and Per Capita

The consumption by source for Lexington is difficult to determine. Typically, this information is not at the city scale but on system-wide scales. Purchasing outside energy from third parties also compounds this task for verifying information and therefore left at the state level.

## Consumption by End User

In 2007, the Nebraska Energy Office compiled statewide statistics on energy consumption in the sectors of Residential, Commercial and Industrial.

### 2007 Residential Sector

- 1) Natural Gas: 47.5%
- 2) Electricity: 40.2%
- 3) Petroleum: 7.7%
- 4) Renewable Energy: 4.64%  
(*wood 4.38; geothermal 0.22; solar 0.04*)
- 5) Coal: less than 1%

### 2007 Commercial Sector

- 1) Electricity: 48.06%
- 2) Natural Gas: 45.88%
- 3) Petroleum: 4.1%  
(*diesel fuel 1.65; propane 1.58; motor gasoline 0.88; kerosene 0.01*)
- 4) Renewable Energy: 1.79%
- 5) *geothermal 0.92; wood 0.85; ethanol 0.02*
- 6) Coal: Less than 1%

### 2007 Industrial Sector (including the transportation sector)

- 1) Natural Gas: 38.13%
- 2) (*Petroleum*) Diesel Fuel: 22.66%
- 3) Electricity: 19.77%
- 4) Petroleum: 10.88%  
(*asphalt and road oil 3.82; propane 3.51; motor gasoline 2.33; residual fuel 0.19; lubricants 0.14; kerosene 0.01; other petroleum 0.88*)
- 5) Coal: 5.13%
- 6) Renewable Energy: 3.44% (*wood/wood waste 3.38; ethanol 0.06*)

Nebraska's energy consumption by end-user sector as it compares to the United States in 2010 is shown in Table 33. This information was compiled by the United States Energy Information Administration (EIA).

### Energy Consumption by End-Use Sector

## Nebraska 2010

SECTOR	Nebraska TRILLION BTU	U.S. TRILLION BTU
Residential	165.4 (#36)	21,836.2
Commercial	143.8 (#35)	18,040.1
Industrial	352.4 (#27)	30,390.6
Transportation	182.2 (#38)	27,443.8
Total Consumption	843.8 (#33)	97,710.6

Table 33: Energy Consumption by End-Use Sector, 2010

# lexington

## Local Utility Provider

The City of Lexington serves its citizens affordable utilities by purchasing wholesale energy from Nebraska Public Power District (NPPD). The Electric Rebate Incentive program is available for Lexington residents and commercial customers for high efficiency heat pump purchases. It relates to new, conversion, or upgrade installations with electric back-up heating only.

The first step of the Electric Rebate Incentive is for the citizen or the hired contractor to fill out two applications. One is the City of Lexington Electric Rebate Program Application with basic information. The High Efficiency Heat Pump Program application is the second form that has more detailed questions. The second step of the rebate program is for the contractor to provide a Certificate of Product Rating Form from AHRI. The final step is to bring these required forms to the City Inspection Department to schedule an inspection for verification of properly installed equipment.

Both Lexington and NPPD contribute to the rebate incentives. It is a good investment to improve the efficiency of heat pumps but research must be done to verify that the upfront cost with the benefit of rebates will pay off in the long term. There are also incentives for improving efficiency in lighting, insulation, cooling systems, irrigation and industrial motors. For more information and the various incentives, visit the City of Lexington’s or NPPD’s websites or contact the city inspection or utilities department.

The City of Lexington’s utilities department works on a fiscal year from October to September. The following table represents the electricity used per year and is measured in kilowatt hours. Also note, Commercial-Large includes downtown, churches, parks, and schools.

City of Lexington Utilities	2006 - 2007	2007 - 2008	2008 - 2009	2009 - 2010	2010 - 2011	2011 - 2012
<i>Units in kWh</i>						
<b>Basic Residential</b>	25,014,318	24,381,972	24,156,847	26,101,893	26,221,017	24,021,853
<b>Commercial - Small</b>	12,628,440	12,891,876	12,117,482	12,847,381	12,351,211	11,895,223
<b>Commercial - Large</b>	17,041,780	17,089,608	17,517,144	17,642,229	17,003,078	18,555,386
<b>Industrial</b>	118,049,933	112,902,831	116,836,278	124,924,181	124,869,734	119,737,332

Table 34: Energy Usage Trend, City of Lexington, 2006 - 2012

## Renewable Energy Sources

According to the U.S. Energy Information Administration, The nation as a whole used a higher percentage of renewable energy than Nebraska. In 2008, 7% of the energy consumption in the United States was from renewable sources. That year the sources of energy for the nation were petroleum (37%), natural gas (24%), coal (23%), nuclear electric power (8%), and renewable energy (7%). The sources of renewable energy were solar (0.07%), geothermal (0.35%), wind (0.49%), hydropower (2.38%), and biomass (3.71%).

According to the Nebraska Energy Office, it is reported that in 2007, three percent of Nebraska's energy consumption was from renewable energy sources. The sources of energy for Nebraska in 2007 were petroleum (33%), coal (31%), natural gas (21%), nuclear power (17%) and renewable energy (3%). The renewable sources were biomass (1.48%), conventional hydroelectric power (0.496%), ethanol (0.379%), wind (0.309%), geothermal energy (0.115%), and solar (0.005%).

Most renewable energy systems are used as a supplemental energy source. Even on a small scale, it can help alleviate pressure on the local energy grid during the peak hours of demand. Technology continues to advance in creating more available options to the typical household consumer. Not all renewable energy sources will be a perfect match for Lexington, but some energy options will make sense to investigate in a cost analysis for the homes, businesses, or public investment. Renewable energy systems in Nebraska include wind power, hydro power, biofuels, and solar power.

### Wind Power

In the Environmental Information Administration's (EIA) 2011 Profile for the State of Nebraska, the National Renewable Energy Laboratory estimates that 92 percent of Nebraska has suitable conditions for wind-powered electricity. Community-scale wind projects of 50 meters high are a popular height and size.

The Nebraska Power Association reported that 195 MW of wind projects are committed resources and projected to be on line by the end of 2012 as well as available for the 2013 summer peak. The only downside to wind power is the effectiveness of systems during daytime peak hours since higher winds are recorded at nighttime when there is less demand.

### Biofuels

**Biomass** is from plants or animals, and can be converted in biofuels for energy production. Examples of this fuel include algae, fly ash (a byproduct of coal and concrete products), manure, crop residue on the surface of fields, and the burning of woody mass in pellet form.

**Waste-to-energy**, also known as energy from garbage municipal solid waste (MSW) include items such as paper, cardboard, food scraps, grass clippings, leaves, wood, leather products, and other non-biomass combustible material plastics made from petroleum.

**Biogas** includes methane gas collection and natural gas production from landfills. This seems to be the more practical approach to renewable energy as a collective *county*-wide decision. The Nebraska Power Association concluded their Statewide Coordinated Long Range Power Supply Study in July 2012.

### Solar Power

Solar Power (photovoltaic and other options) can benefit individual households as well as businesses. There should be a concerted effort to increase interest in what solar systems can do for a business's bottom line. The front-up cost may seem daunting but the rate of return may surprise people. There are ways to help finance the initial amount of investment, and incentives may be available. Nebraska Energy Office is a great resource to look for funding options such as low interest loans. Communities and their business leaders should consider their options when purchasing new units.

From a commercial standpoint, the top five businesses that would benefit from solar energy would be laundromats (heating the water), breweries (nonstop operation, heating and cooling ingredients), data storage facilities (non-stop running of computers in the “server farm”), restaurants (air-conditioning and lighting), and manufacturing facilities (typically large machines that need high amount of energy). Solar Power would usually be available during peak hours.

On a much larger scale, the CSP or Concentrated Solar Power could be helpful to support or supplement the local utility grid for isolated communities and farmers. They could use the energy source for supplementing energy consumption of a community, irrigation purposes, and other farming needs.

**Biogas Example:** Lincoln Electric System (LES) has a committed landfill gas generator project for the 2013 summer peak period. This generator will add 4 MW of capacity and will bring the total amount to roughly 10 MW of landfill gas. The advantage is that Biogas is usually part of the system that is already in place.

### Hydro Power

There are a number of hydro plants throughout Nebraska, including water and waste water treatment for treatment for various communities and subdivisions. The proposed national renewable portfolio standards do not allow for existing hydro units to count toward renewable energy goals.

Nebraska is divided into various watersheds and corresponding Natural Resource Districts (NRDs) that deal with ground and surface water. Through the assistance of the NRDs and other state agencies, and because of Nebraska's many rivers and streams, it makes sense to plan for and invest in new hydro plants.

Awareness of the area's watershed(s) can help a community make appropriate water-related environmental decisions. There are a number of practices residents can employ to help prevent runoff. A great beginning- to-intermediate source for citizens interested in preventing or reusing stormwater runoff is the City of Lincoln's Alternative Stormwater “Best Management Practices Guidelines” for watershed management. As for public treatment of water and wastewater, cost-saving efforts include co-locating anaerobic digesters. Algae-wheel systems can be harvested and used as a renewable feedstock for biofuels.

## Additional Energy Information and Documentation

### Recycling

Recycling in Lexington is promoted through local service organizations, youth organizations, and Keep Lexington Beautiful. Citizens are encouraged to support these efforts and recycle whatever consumables they can.

### Nebraska's Energy Plan

In 2011, the Nebraska Energy Office released the Nebraska Energy Plan which provides strategies for the state to consider in meeting their three objectives:

- Ensure access to affordable and reliable energy for Nebraskans to use responsibly
- Advance implementation and innovation of renewable energy in the state
- Reduce petroleum consumption in Nebraska's transportation sector

This short and information-packed document is full of examples and future plans of how the State of Nebraska is advancing our diversity of energy sources while maintaining low-cost and reliable energy to its citizens. <http://www.neo.ne.gov/Energyplan2011.pdf>

### Energy Saving Tips

The Nebraska Energy Office has listed ways to save money on energy bills for the home, farm, business, and vehicles. Options for energy savings can be found on the Office's web site at <http://www.neo.ne.gov/tips/tips.htm>. Lexington residents and businesses are encouraged to learn more and take advantage of these conservation measures.

On their homepage, [www.nppd.com](http://www.nppd.com), Nebraska Public Power District has a "Save Energy Section" which has more informational energy tips and incentives for your home and business. There is also information on renewable energy and net metering. NPPD operates in almost every county in Nebraska and is a great resource to use.