City of Scottsbluff, Nebraska
Monday, September 8, 2014
Regular Meeting

Item NewBiz4

Energy Element

Comp Plan: Energy Element

Applicant: City

Owner(s): N/A

Location: N/A

Staff Contact: Annie Folck

SCOTTSBLUFF PLANNING COMMISSION Staff Report

To: Planning Commission
From: Development Services Department
Date: September 8, 2014
Subject: Energy Element – Comprehensive Dev. Plan
Location: N/A

Background

LB 997 was introduced in 2010 and required all municipalities, except villages to adopt an Energy Element into the Comprehensive Development Plan by January 1, 2015. Marvin Consultants were hired to create a plan for the City of Scottsbluff. With the Planning Commission's recommendation to City Council they can approve and adopt the Energy Element into the City's Comprehensive Plan, before the deadline of January 2015 and keep our Comp Plan in compliance.

The Energy Element is to be used as tool for reducing energy use, a way for communities to save money & energy, an opportunity to eliminate barriers to energy efficiency and a chance to increase energy independence. A copy of the plan is attached.

RECOMMENDATION

Approve
Make a motion for positive recommendation for City Council to approve and adopt the Energy Element plan into our Comprehensive Development Plan subject to the following condition(s):

Deny
Make a motion for negative recommendation to disapprove the Energy Element plan into our Comprehensive Development Plan for the following reason(s):

Table
Make the motion to TABLE the Energy Element plan into our Comprehensive Development Plan for the following reason(s):


ENERGY ELEMENT

ENERGY ELEMENT

Energy usage in the early 21st Century is becoming a critical issue throughout Nebraska as well as the entire United States. Our dependency on energy sources that are not renewable has increased significantly over the past 100 years. Energy usage comes in several forms, such as:

- Lighting our homes, businesses, and industries
- Heating our homes, businesses, and industries
- Heating our water for homes, businesses, and industries
- Food preparation
- Transportation – both personal and business related
- Recreation and Entertainment – vehicular, computers, music, etc.

The 21st Century ushered in an increased concern for energy usage and its impacts on the environment. With the increased concern for the environment came an increased understanding of the carbon footprint generated by any one individual as well as striving towards modifying our behavior patterns in order to lessen that footprint. In addition, the phrase and concept of sustainability has become more widely used, even in the smaller communities of Nebraska and United States.

Energy and the issues connected to the different sources are becoming more critical every year. The need for the Energy Element in the Scottsbluff Comprehensive Development Plan should be something desired as opposed to required. However, during the 2010 Legislative Session of the Nebraska Unicameral, the State Senators passed LB 997 which required this section become a part of all community and county comprehensive plans, except for Villages. The passage of LB 997 appears to be a first step toward comprehensive plans addressing the entire issue of energy conservation and/or sustainability.

Sustainability

Sustainability, in today's discussions, has a number of meanings. According to Webster's Third International Dictionary, the verb "sustain" is defined as "to cause to continue...to keep up especially without interruption, diminution or flagging". However, the Brundtland Commission Report in 1987, described sustainability as "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs". In addition, the phrase and concept of sustainability has become more widely used, even in Nebraska.

All of us living in today's world need to begin switching gradually to cleaner and more renewable resources. By doing so it will aid future generations with their quality of life. The more renewable energy sources become the norm for our generation, the more likely these sources will be second nature and common place in the future.

Americans have grown to rely heavily on electricity. However, state and federal policies have been increasingly more insistent on curbing this reliance; especially, those sources that are produced by non-renewable fossil fuels such as oil and coal. Federal policy has set a goal of 20% of all electricity, by 2030, in the United States be from renewable sources. Renewable sources would include solar, wind, water, geothermal and any number of other sources that have not yet been discovered or brought to production levels.

ENERGY INFRASTRUCTURE

Electrical Power

Electrical power in Scottsbluff is supplied by Nebraska Public Power District. The electrical system is also operated by Nebraska Public Power District.

Power is supplied via two 115 kV lines. Five main distribution substations, with a total capacity of more than 80 MVA. Two peripheral distribution substations capable of serving 3 MVA of load. All can be served from at least two different 34.5 kV sources. The heart of the Scottsbluff distribution system and the peripheral area distribution systems are served by 12.47 kV distribution lines. All substations and lines have been designed and built with future load growth in mind.

Source: http://sites.nppd.com/aedc/fastfacts.asp?city=Scottsbluff

At the time of this element, NPPD was in the process of constructing a 23-mile transmission line between a substation near Stegall and Scottsbluff. The following is NPPD's write up on the project…

NPPD plans to construct an 115,000-volt electric transmission line from the existing Scottsbluff Substation to a new substation to be built approximately five miles south of Stegall near the existing Stegall Substation owned by Basin Electric Power Cooperative. The exact location of the new substation is yet to be determined.

The approximate 23-mile transmission line will enhance transmission system reliability in the western Nebraska Panhandle region. The new line will also meet the North American Electric Reliability Corporation's Reliability Standards for the western Nebraska area. The line is expected to be in service by mid-2017.
Source: http://www.nppd.com/stegall-scottsbluff/

Natural Gas Service
Natural gas service in Scottsbluff is supplied and operated by SourceGas. Natural gas is transported through a 16 inch transmission pipeline, with an operating pressure of approximately 700-1,000 lbs. per sq. inch. SourceGas supplies natural gas transportation to residential, commercial, industrial, and agricultural customers through 3 pipeline systems.
Source: http://sites.nppd.com/aedc/fastfacts.asp?city=Scottsbluff

ENERGY USE BY SECTOR

This section analyzes the energy use by residential, commercial, and industrial and other users. This section will examine the different types of energy sources that are utilized by these different sectors.

Table 1 shows the overall electricity usage by all consumers in Scottsbluff. The categories are reflective of the ones established by the City. The categories are defined as:
Residential = all connections and demand by households in Scottsbluff
Commercial = all retail and office users within Scottsbluff
Industrial = all industrial users within Scottsbluff

Table 1: Total Electrical Usage Scottsbluff 2011 through 2013

	2011	2012	2013	% Change
Residential (kWh)	67,109,244	65,053,954	66,956,427	-0.23%
Per customer usage	10,361	10,035	10,331	-0.29%
Residential % of Total	32%	29%	29%	-11%
Commercial (kWh)	105,447,988	105,764,552	105,423,329	-0.02%
Per customer usage	68,696	69,037	68,015	-0.99%
Commercial % of total	51%	47%	45%	-10.59%
Industrial (kWh)	16,779,157	34,203,632	42,661,668	154.25%
Per customer usage	4,194,789	8,550,908	10,665,417	154.25%
Industrial % of total	8%	15%	18%	127%
Other Municipal (kWh)	19,282,931	18,987,320	18,241,951	-5.40%
Other Municipal % of total	9%	8%	8%	-15.40%
Total Usage within corporate limits	208,619,320	224,009,458	233,283,375	11.82%
	100%	100%	100%	0.00%
Customer by Class				
Residential	6,477	6,483	6,481	0.06%
Comercial	1,535	1,532	1,550	0.98%
Industrial	4	4	4	0.00%
Total	8,016	8,019	8,035	0.24%

Source: Nebraska Public Power District

Table 1 shows the usage of electricity throughout the Scottsbluff corporate limits from 2011 through 2013. The data indicate the usage by residential, commercial, industrial uses, and municipal uses (street lighting and other municipal uses) for the time period. In addition, the Table indicates the number of customers per sector. Overall, from 2011 to 2013, the total consumption increased by 11.8% while the customer base remained relatively stable with 19 new customers or a 0.2% increase.

Residential Uses
The data in Table 1 indicate the percent of total used by sector. The Table shows the overall percentage for residential customers went from 32% in 2011 to 29% in 2013; while the overall number of residential customers increased by four connections. From 2011 to 2013, the residential demand saw an overall decrease of 0.23%. Overall, the per customer usage also decreased by 0.29% for the same time frame. Electric consumption by residential customers is decreasing slightly on an annual basis.

Ascertaining where these conservation measures are occurring; are residential customers switching from electric water heaters and furnaces to natural gas systems? Is the conservation occurring in changes in thermostats? Is it due to better light sources (CFL or LED vs incandescent)?
It is likely some of all of these but what is critical is that conservation measures seem to be occurring in the community.

The decreases in light of the overall increase in customers indicates the residential users in Scottsbluff are starting to conserve electricity in their day to day lives. This may become even more critical as stiffer Federal regulations go into place regarding the generation of electricity.

Commercial Uses
Scottsbluff's commercial consumption from 2011 to 2013 also decreased and fell by 0.02%; while the total number of consumers increased by 15 customers. During this same time period, commercial uses went from 51.0% of total consumption in 2011 to 45% of consumption in 2013. The average consumption per customer went from 68,696 kWh in 2011 to 68,015 kWh in 2013 or a 0.99% decrease in the three years; most of this decrease came during 2013 and needs to be tracked to see if it continues in to the future.

Ascertaining where these conservation measures is very similar to residential customers. However, commercial consumers are seeing more efficient heating and cooling equipment installed and as retrofits occur more insulation is being installed and the newer fluorescent bulbs and ballasts are more efficient.

This decrease, more so than the Residential, is interesting. Per customer decrease was greater and the increase in the consumer base was larger. This indicates that even greater conservation measures may be occurring in commercial customers than in the residential base.

Industrial Uses
Scottsbluff's industrial sector was the only one that had an increase in consumption from 2011 to 2013. The overall consumption increased by 154.25%; while the total number of consumers remained the same. During this same time period, industrial use went from 8% of total consumption in 2011 to 18% of consumption in 2013. The average consumption per customer went from 4,194,789 kWh in 2011 to 42,661,668 kWh in 2013 or a 154.25% increase in three years. Increases were seen in 2012 and 2013 with the largest coming in 2012. This increase is anticipated to drop closer to the 2011 kWh in the coming years based upon discussions with NPPD.

Since there was no change in the number of customers, it can only be assumed that one or more of the four companies saw increases in production from 2011 to 2013.

Municipal Use
The municipality is singled out as a customer in this analysis. The municipal usage includes electricity used at all municipally owned facilities plus all the public and highway street lighting. This area also showed a solid decrease in consumption between 2011 and 2013, decreasing by 5.4%. All of this decline came from the different municipal facilities.

SHORT-TERM AND LONG-TERM STRATEGIES

As the need and even regulatory requirements for energy conservation increases, residents of communities and even rural areas will need to:
1. Become even more conservative with energy usage
2. Make use of existing and future programs for retrofitting houses, businesses, and manufacturing plants
3. Increase their use of renewable energy sources.

Residential Strategies
There are a number of different strategies that can be undertaken to improve energy efficiency and usage in residences. These strategies range from simple (less costly) to complex (costly). Unfortunately not all of the solution will have an immediate return on investment. As individual property owners, residents will need to find strategies that fit into their ability to pay for savings at the present time.

There are several ways to make a residence more energy efficient. Some of the easiest include:
- Converting all incandescent light bulbs to CFL's or LED's bulbs
- Changing air filters more regularly

- Installing additional insulation in the attic
- Keeping thermostats set a cooler levels in the winter and higher levels in the summer
- Converting standard thermostats to digital/programmable thermostats
- Changing out older less efficient Air Conditioners and Furnaces to newer high-efficiency units
- Changing out older appliances with new Energy Star appliances

Some of the more costly ways to make a residence more energy efficient include:
- New insulation in exterior walls
- Addition of solar panels for either electrical conversion and/or water heater systems in cooperation with NPPD and in compliance with the local zoning codes.
- Adding individual scale wind energy conversion systems in cooperation with NPPD and in compliance with the local zoning codes.
- Installing geothermal heating and cooling system in cooperation with NPPD and in compliance with the local zoning codes.
- Installation of energy-efficient low-e windows

Commercial and Industrial Strategies
Strategies for energy efficiency within commercial and industrial facilities can be more difficult to achieve than those for residential uses. Typically, these improvements will require a greater amount of investment due to the size of most of these facilities.

There are a number of different strategies that can be undertaken to improve energy efficiency and usage in residences. Again, not all of the solutions will have an immediate return on investment. As individual property owners, property owners will need to find strategies that will fit into their ability to pay for savings at the present time.

There are several ways to make a commercial business more energy efficient. Some of the easiest include:
- Converting all incandescent light bulbs to efficient Florescent Lights, CFL's, or LED's on small fixtures
- Keeping thermostats set a cooler levels in the winter and higher levels in the summer
- Converting standard thermostats to digital/programmable thermostats
- Installing additional insulation in an attic space
- Changing out older less efficient Air Conditioners and Furnaces to newer high-efficiency units

Some of the more costly ways to make a business more energy efficient include:
- Installation of energy-efficient windows and/or storefronts
- New insulation in exterior walls, if possible
- Addition of solar panels for either electrical conversion and/or water heater systems in cooperation with NPPD and in compliance with the local zoning codes.
- Adding individual scale wind energy conversion systems in cooperation with NPPD and in compliance with the local zoning codes.
- Installing geothermal heating and cooling system in cooperation with NPPD and in compliance with the local zoning codes.

RENEWABLE ENERGY SOURCES

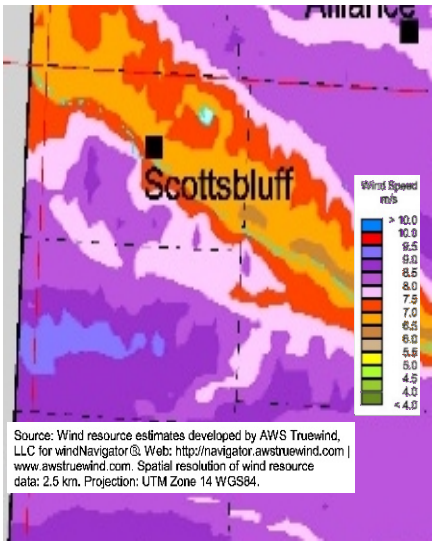
Renewable energy sources are those natural resources such as the wind, sun, water, the earth (geothermal), and even methane (from natural resources or man-made situations) that can be used over and over again with minimal or no depletion. The most common sources of renewable energy resources used in Nebraska is the wind, the sun, the water and/or the earth. The following are examples of how these renewable resources can be used to reduce our dependency on fossil fuels.

Wind
The wind is one of those resources that seem to be in abundance in Nebraska. Wind is not a new technology in Nebraska; the pioneers that settled in Nebraska used wind mills for power and to work the water wells on their farms and ranches.

Wind can be used to produce electricity through the construction of small-scale or utility/commercial grade wind conversion systems (wind turbines). However,

not all areas of the state have the ideal levels needed to produce electricity on a utility or commercial level; but the use of small-scale wind turbines on homes and businesses will work in most parts of Nebraska.

Figure 1:
ANNUAL AVERAGE WIND SPEED AT 80 METERS



The wind quality in Scottsbluff and Scotts Bluff County is average to above average, especially in the Scottsbluff area and points south of the community. The darker the purple areas are the more ideal locations for wind. However, any future wind development will be determined with the use of meteorological towers used to compile wind data for approximately a one year period prior to making any future decisions.

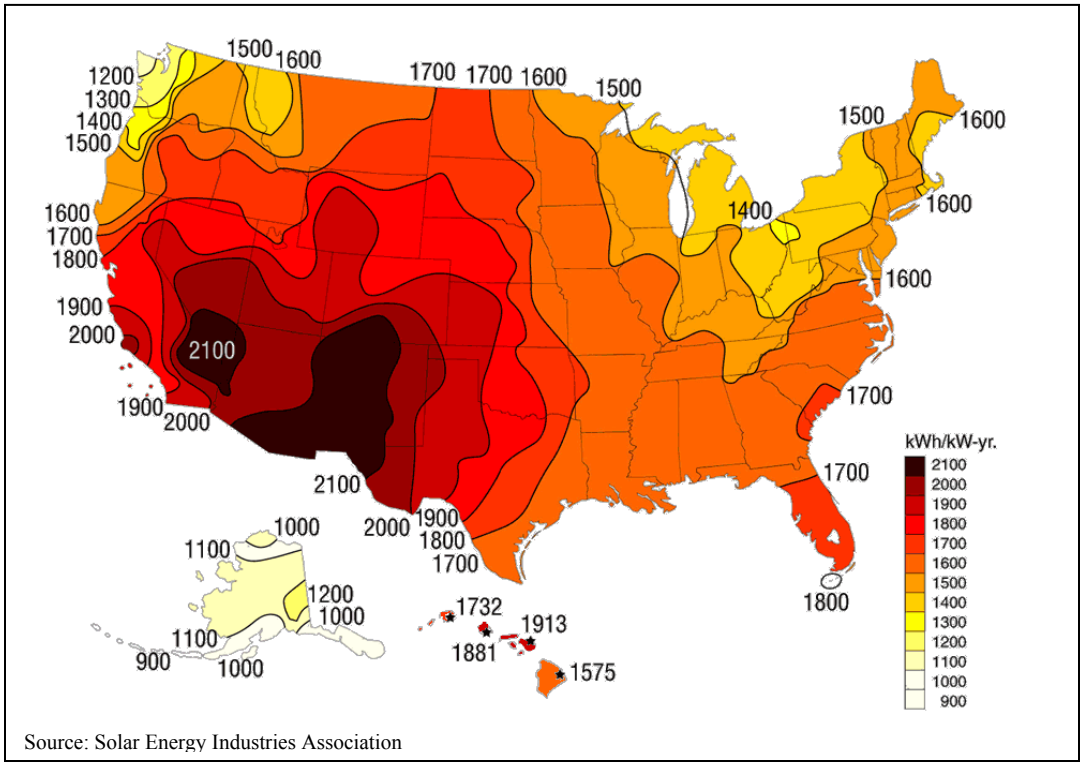
Solar

Solar energy has been around for decades and it last hit a high in popularity in the 1970's. However, today's solar energy design is much more efficient and are more aesthetically pleasing. Some of the aesthetic improvements have to do with the fact that today's systems are not as bulky as their ancestors. Today solar is being used much like wind turbines, on a small-scale level (home or business) or a much grander level (solar farms).

Solar energy includes solar water and space heating as well as taking solar photovoltaic panels to convert the sun's rays into electricity. Solar panels can typically produce between 100 and 200 watts per square meter at an installed cost of $7 to $9 per watt, but these costs are becoming less every year as more solar units are commissioned and new more cost effective technologies are developed.

Based upon the diagram to the right there is great solar potential in the state of Nebraska. A majority of the state lies within some of the better areas in the country for solar potential.

Figure 2:
SOLAR POTENTIAL CONTOURS



Source: Solar Energy Industries Association

Geothermal Energy
Geothermal energy includes a process where a series of pipes are lowered into vertical cores called heat-sink wells. The pipes carry a highly conductive fluid that either is heated or cooled by the constant temperature of the ground. The resulting heat exchange is then transferred back into the heating and cooling system of a home or other structure. This is called a geothermal heat exchange system or ground source heat pumps. The California Energy Commission estimates the costs of a geothermal system can earn net savings immediately when financed as part of a 30-year mortgage *(Source: American Planning Association, PAS Memo January/February 2009)*.

Renewable Energy in Scottsbluff and Scotts Bluff County
Renewable energy in Scottsbluff and the Scotts Bluff County area could be an extremely good means to conserve energy into the future. One key issue that will present an obstacle is the varying topography of the Panhandle area especially outside the North Platte River valley.

The flat bottomlands are likely habitat for water fowl and other birds. In addition, these areas have been subject to flooding in in the past. Finally, the soils within these areas may be an issue when attempting to construct the footings for a wind turbine.

The City has already adopted some wind regulations into their code. This should aid in the future development of commercial turbines within their jurisdiction.

Solar panels throughout Nebraska, especially the panhandle region may be difficult due to the number of hail storms that track through the area. Any future solar development will need to be capable of sustaining impacts from future hail storms.

Geothermal systems, may be a positive approach depending on the water table of the area. High water tables tend to create construction issues for this type of renewable energy.

However, the other types of renewable energy sources are possible within Scotts Bluff County, including methane and solar.

ENERGY PROGRAMS IN NEBRASKA

The following provides a basic history and description of some newer programs in Nebraska; interested parties should contact the State of Nebraska Energy Office or their local public power district.

The following information is an excerpt from the Database of State Incentives for Renewables & Efficiency.

C-BED Program

In May 2007, Nebraska established an exemption from the sales and use tax imposed on the gross receipts from the sale, lease, or rental of personal property for use in a community-based energy development (C-BED) project. The Tax Commissioner is required to establish filing requirements to claim the exemption. In April 2008 L.B. 916 made several amendments to this incentive, including: (1) clarified C-BED ownership criteria to recognize ownership by partnerships, cooperatives and other pass-through entities; (2) clarified that the restriction on power purchase agreement payments should be calculated according to gross* and not net receipts; (3) added language detailing the review authority of the Tax Commissioner and recovery of exempted taxes; and (4) defined local payments to include lease payments, easement payments, and real and personal property tax receipts from a C-BED project.

A C-BED project is defined as a new wind energy project that meets one of the following ownership conditions:

- For a C-BED project that consists of more than two turbines, the project is owned by qualified owners with no single qualified owner owning more than 15% of the project and with at least 33% of the power purchase agreement payments flowing to the qualified owner or owners or local community; or
- For a C-BED project that consists of one or two turbines, the project is owned by one or more qualified owners with at least 33% of the power purchase agreement payments flowing to a qualified owner or local community.

In addition, a resolution of support for the project must be adopted by the county board of each county in which the C-BED project is to be located or by the tribal council for a C-BED project located within the boundaries of an Indian reservation.

A qualified C-BED project owner means:

- a Nebraska resident;
- a limited liability company that is organized under the Limited Liability Company Act and that is entirely made up of members who are Nebraska residents;
- a Nebraska nonprofit corporation;
- an electric supplier(s), subject to certain limitations for a single C-BED project; or
- a tribal council.

In separate legislation (LB 629), also enacted in May 2007, Nebraska established the Rural Community-Based Energy Development Act to authorize and encourage electric utilities to enter into power purchase agreements with C-BED project developers.

** LB 561 of 2009 established that gross power purchase agreement payments do not include debt financing if the agreement is entered into on or before December 31, 2011, and the qualified owners have a combined total of at least 33% of the equity ownership in the C-BED project.*

Local Government and Renewable Energy Policies

Local governments need to take steps to encourage greater participation in wind generation. Cities and counties can do a number of items to make these projects more attractive. Some of the things that could be done are:

- Develop or amend existing zoning regulations to allow small-scale wind turbines as an accessory use in all districts
- Develop or amend existing zoning regulations to exempt small-scale turbines from maximum height requirements when attached to an existing or new structure.
- Work with the Nebraska Public Power District and/or local public power district on ways to use wind turbines on small-scale individual projects or as a source of power for the community.

Net Metering in Nebraska

LB 436, signed in May 2009, established statewide net metering rules for all electric utilities in Nebraska. The rules apply to electricity generating facilities which use solar, methane, wind, biomass, hydropower or geothermal energy, and have a rated capacity at or below 25 kilowatts (kW). Electricity produced by a qualified renewable energy system during a month shall be used to offset any kilowatt-hours (kWh) consumed at the premises during the month.

Any excess generation produced by the system during the month will be credited at the utility's avoided cost rate for that month and carried forward to the next billing period. Any excess remaining at the end of an annualized period will be paid out to the customer. Customers retain all renewable energy credits (RECs) associated with the electricity their system generates. Utilities are required to offer net metering until the aggregate generating capacity of all customer-generators equals one percent of the utility's average monthly peak demand for that year.

State Law of Solar and Wind Easements
Nebraska's solar and wind easement provisions allow property owners to create binding solar and wind easements for the purpose of protecting and maintaining proper access to sunlight and wind. Originally designed only to apply to solar, the laws were revised in March 1997 (Bill 140) to include wind. Counties and municipalities are permitted to develop zoning regulations, ordinances, or development plans protecting access to solar and wind energy resources if they choose to do so. Local governing bodies may also grant zoning variances to solar and wind energy systems that would be restricted under existing regulations, so long as the variance is not substantially detrimental to the public good.

LB 568, enacted in May 2009, made some revisions to the law and added additional provisions to govern the establishment and termination of wind agreements. Specifically, the bill provides that the initial term of a wind agreement may not exceed forty years. Additionally, a wind agreement will terminate if development has not commenced within ten years of the effective date of the wind agreement. If all parties involved agree to extend this period, however, the agreement may be extended.

Incentive Programs
Programs change from time to time and are typically offered locally and/or through NPPD.